

**NASA
Technical
Memorandum**

NASA TM -82542



**ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-7)
LAUNCH**

**By D. L. Johnson, C. K. Hill, and G. W. Batts
Systems Dynamics Laboratory**

July 1983

**(NASA-TM-82542) ATMOSPHERIC ENVIRONMENT FOR
SPACE SHUTTLE (STS-7) LAUNCH (NASA) 49 p
HC A03/MF A01 CSCL 22B**

N 83-33929

**Unclassified
G3/16 41990**

NASA

**National Aeronautics and
Space Administration**

George C. Marshall Space Flight Center

TECHNICAL REPORT STANDARD TITLE PAGE

1. REPORT NO. NASA TM - 82542	2. GOVERNMENT ACCESSION NO.	3. RECIPIENT'S CATALOG NO.	
4. TITLE AND SUBTITLE Atmospheric Environment for Space Shuttle (STS-7) Launch		5. REPORT DATE July 1983	
7. AUTHOR(S) D. L. Johnson, C. K. Hill, and G. W. Batts*		6. PERFORMING ORGANIZATION CODE	
9. PERFORMING ORGANIZATION NAME AND ADDRESS George C. Marshall Space Flight Center Marshall Space Flight Center, Alabama 35812		8. PERFORMING ORGANIZATION REPORT #	
		10. WORK UNIT NO.	
		11. CONTRACT OR GRANT NO.	
		13. TYPE OF REPORT & PERIOD COVERED Technical Memorandum	
12. SPONSORING AGENCY NAME AND ADDRESS National Aeronautics and Space Administration Washington, D.C. 20546		14. SPONSORING AGENCY CODE	
15. SUPPLEMENTARY NOTES Prepared by Systems Dynamics Laboratory, Science and Engineering *Computer Sciences Corporation, Huntsville, Alabama			
16. ABSTRACT This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-7 launch time on June 18, 1983, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimosphere measured vertical wind profiles is given in this report. Also presented are wind and thermodynamic parameters representative of surface and aloft conditions in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-7 vehicle ascent and Acoustic/SRB descent have been constructed. The STS-7 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 936-53-22-368 with Johnson Space Center.			
17. KEY WORDS STS-7 Launch Atmospheric Summary Pressure Temperature Relative Humidity Winds, Winds Aloft, Clouds SRB Descent Atmospheric Summary	18. DISTRIBUTION STATEMENT  Unclassified - Unlimited		
19. SECURITY CLASSIF. (of this report) Unclassified	20. SECURITY CLASSIF. (of this page) Unclassified	21. NO. OF PAGES 49	22. PRICE NTIS

ACKNOWLEDGMENTS

The authors wish to thank Dr. James Arnold, Gary Jedlovec, and David Keller of the Atmospheric Effects Branch, MSFC, for their help in extracting atmospheric data and satellite cloud photographs that are used in this report. Also, special thanks to Messrs. Bill Jeffries, Bobby Vayda, and Joe Willett of Computer Sciences Corporation for their assistance in processing all the upper air data used in producing the STS-7 final meteorological data tapes. Finally, appreciation is expressed to Rhonda Gregory and Sherry Anderson of Boeing Computer Support Services for GRA model and ESDB computer support, respectively.

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. SOURCES OF DATA	1
III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME	1
IV. SURFACE OBSERVATIONS AT LAUNCH TIME	2
V. UPPER AIR MEASUREMENTS DURING LAUNCH.....	2
A. Wind Speed.....	2
B. Wind Direction.....	2
C. Prelaunch/Launch Wind Profiles.....	3
D. Thermodynamic Data.....	3
E. SRB Upper Air and Surface Measurements	3
VI. ATMOSPHERIC SUMMARY CONDITIONS FOR STS LAUNCHES.....	3
REFERENCES	43

PRECEDING PAGE BLANK NOT FILMED

LIST OF ILLUSTRATIONS

Figure	Title	Page
1.	Surface synoptic chart 27 min after launch of STS-7.....	32
2.	500 mb map 27 min after launch of STS-7.....	33
3.	GOES-5 visible imagery of cloud cover 3 min prior to launch of STS-7 (1130 UT, June 18, 1983). 500-mb contours and wind barbs are also included for 1200 UT.....	34
4.	Enlarged view of GOES-5 visible imagery of cloud cover 3 min prior to launch of STS-7 (1130 UT, June 18, 1983). Surface temperatures and wind barbs for 1100 UT are also included.....	35
5.	Scalar wind speed and direction at launch time of STS-7.....	36
6.	STS-7 prelaunch/launch Jimsphere-measured wind speeds (FPS) ..	37
7.	STS-7 prelaunch/launch Jimsphere-measured wind directions (degrees)	38
8.	STS-7 prelaunch/launch Jimsphere-measured in-plane component winds (FPS). Flight azimuth = 90 degrees	39
9.	STS-7 prelaunch/launch Jimsphere-measured out-of-plane component winds (FPS). Flight azimuth = 90 degrees.....	40
10.	STS-7 temperature profiles versus altitude for launch (left) and Acoustic/SRB descent (right)	41
11.	STS-7 scalar wind speed and direction for Acoustic/SRB descent..	42

LIST OF TABLES

Table	Title	Page
1.	Systems Used to Measure Upper Air Wind Data for STS-7 Ascent.....	4
2.	Surface Observations at STS-7 Launch Time	5
3.	STS-7 Pre-Launch Through Launch KSC Pad 39A Meteorological Measurements.....	6
4.	STS-7 Final L+O Ascent Meteorological Data Tape	7
5.	STS-7 Final Acoustic/SRB Descent Meteorological Data Tape.....	24
6.	Selected Atmospheric Observations for the Flight Tests of the Space Shuttle Vehicles.....	31

TECHNICAL MEMORANDUM

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-7) LAUNCH

I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle/STS-7 vehicle. This Space Shuttle vehicle was launched from Pad 39A at Kennedy Space Center (KSC), Florida, on a bearing of 90 deg east of north at 1133 UT (0733 EDT) on June 18, 1983.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-7, together with the sequence of prelaunch Jimosphere measured winds aloft profiles from L-14 hr through liftoff. The general weather situation for the launch and flight area is described, and surface and upper level wind/thermodynamic observations near launch time are given. Surface and upper level wind/thermodynamic parameter estimates are also presented for the Acoustic/SRB descent/impact analyses.

Previous MSFC-related launch vehicle atmospheric environmental conditions have been published as Appendix A of individual MSFC Saturn Flight Evaluation Working Group reports [1]. Office memorandums have been issued for previous flights giving launch pad wind information. A report has also been published [2] which summarizes most launch atmospheric conditions observed for the past 155 MSFC/ABMA-related vehicle launches through SA-208 (Skylab 4). Reports summarizing ASTP, STS-1, STS-2, STS-3, STS-4, STS-5, and STS-6 launch conditions are presented in References 3, 4, 5, 6, 7, 8, and 9, respectively.

II. SOURCES OF DATA

Atmospheric observational data used in this report were taken from synoptic maps made by the National Weather Service, plus all available surface observations and measurements from around the launch area. Upper air observations were taken from balloon-released instruments sent aloft from Cape Canaveral Air Force Station (CCAFS). High-altitude winds and thermodynamic data were measured by the Super-Loki rocketsondes launched from the CCAFS. Table 1 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent meteorological data tape. The L-0 Rawinsonde and Super-Loki rocket data were used in the upper level atmospheric regions for the construction of the final Acoustic/SRB descent meteorological data tape. Data cutoff altitudes are also given in Table 1.

III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME

A narrow ridge of high pressure, located along the Atlantic coast, and extending into the Gulf of Mexico, was an atmospheric influence over the Florida peninsula during the early morning launch. Along the peninsula, surface winds were northerly to north-northeasterly, ranging in magnitude from 0 to 10 ft/sec. Two levels of 6/10 total cloud cover was present, along with moderate humidity and warm temperatures

(upper 70's) prevailing throughout the early morning countdown period. Figure 1 gives the surface weather map 27 min after launch. Figure 2 presents the wind flow aloft at the 500 mb level. Westerly to north-westerly winds dominated the flow aloft over the KSC Florida area.

Cloudiness was mainly prevalent over the KSC launch complex and adjacent ocean areas as shown in Figure 3. Figure 3 presents the GOES-5 visible picture taken 3 min prior to launch (1130 UT). Broken skies consisting of 4/10 cumulus clouds at 2600 ft and 2/10 stratocumulus at 5000 ft were present during launch. Figure 4 shows an up-close visible shot of the Florida peninsula as recorded by GOES-5, taken at 1130 UT.

IV. SURFACE OBSERVATIONS AT LAUNCH TIME

Surface observations at launch time for selected KSC locations are given in Table 2. Included are pad 39A, Shuttle runway, and CCAFS balloon release station observations. Neither precipitation nor lightning was observed at launch time.

Table 3 presents Pad 39A wind data along with other standard hourly meteorological measurements and sky observations for the 6-hr period prior to launch of STS-7. Values for wind speed and direction are given for the 84 m (275 ft) FSS reference level and 18 m (60 ft) pad light pole level.

V. UPPER AIR MEASUREMENTS DURING LAUNCH

The FPS-16 Jimsphere (1150 UT), MSS Rawinsonde (1137 UT), Super-Loki rocketsonde (1340 UT), and Super-Loki Robin (1235 UT) systems were used to measure the upper level wind and thermodynamic parameters for STS-7 launch. At altitudes above the rocket-measured data, the Global Reference Atmosphere (GRA) [10] parameters for June KSC conditions were used. A tabulation of the STS-7 final meteorological data for ascent is presented in Table 4 which lists the wind and thermodynamic parameters versus altitude. A brief summary of parameters is given in the following paragraphs.

A. Wind Speed

At launch time, wind speeds were 5.9 ft/sec (3.5 kn) at 60 ft and increased to a maximum of 76 ft/sec (45 kn) blowing from 278 deg. This maximum occurred at an altitude of 45,900 ft (13,990 m). The winds decreased above this level and then became stronger again at much higher levels, as shown in Figure 5. The overall maximum measured speed was 241 ft/sec (143 kn) at 203,000 ft (61,874 m) altitude.

B. Wind Direction

At launch time, the 60-ft wind direction was from the north-northeast (10 deg) and shifted through the north to a westerly component above 15,000 ft (4572 m). The winds then shifted into the summer-easterly regime above 60,000 ft (18,288 m). Figure 5 shows the complete wind direction versus altitude profile. As shown in Figure 5, wind directions became quite variable at altitudes with low wind speeds.

C. Prelaunch/Launch Wind Profiles

Prelaunch/launch wind profiles presented in Figures 6 through 9 were measured by the Jimsphere FPS-16 system. Data are shown for five measurement periods beginning at L-14 hr and extending through L+0.

The wind speed and direction profiles for the 14-hr period prior to and including L+0 are shown in Figures 6 and 7. The in-plane (right crosswind) and out-of-plane (left crosswind) profiles are given on Figures 8 and 9. The wind speeds and component speeds were not significantly different from the June mean values in the 30,000 to 40,000 ft layer during the period for which data are shown.

D. Thermodynamic Data

The thermodynamic data taken at STS-7 launch time, consisting of atmospheric temperature, dew-point temperature, pressure, and density have been compiled as the STS-7 ascent meteorological data and are presented in Table 4. The associated thermodynamic data taken in support of the acoustic and SRB descent have also been assembled as the STS-7 Acoustic/SRB descent meteorological data and are presented in Table 5. The vertical structure of temperature for the STS-7 ascent and for the SRB descent is shown graphically versus altitude in Figure 10.

The atmospheric thermodynamic parameters of temperature, pressure, and density, measured during STS-7 launch below 228,000 ft (69,494 m) were all within 5 percent of their respective PRA-63 [11] annual values. All these parameters stayed within 18 percent of their respective PRA-63 values, at all levels.

E. SRB Upper Air and Surface Measurements

As has been mentioned in earlier paragraphs, an Acoustic/SRB descent meteorological data tape has also been constructed which consists of data taken from the MSS-Rawinsonde system (1137 UT) and Super Loki Rocketsonde data measured from the CCAFS. Since the U.S. Naval Ship Vandenberg or Redstone were not supporting this launch, the surface measurements taken from the ship (measuring acoustics) stationed in the Atlantic approximately 40 miles downrange were used. The GRA model data were used at altitude levels above the measured rocketsonde data. The tabular values for the Acoustic/SRB descent meteorological tape are presented in Table 5, with wind speed and direction profiles presented in Figure 11. Figure 10 gives the vertical temperature profile.

VI. ATMOSPHERIC SUMMARY CONDITIONS FOR STS LAUNCHES

Given in Table 6 are selected atmospheric L+0 launch conditions for all the Space Shuttle launches.

TABLE 1. SYSTEMS USED TO MEASURE UPPER AIR WIND
DATA FOR STS-7 ASCENT*

Type of Data	Date: June 18, 1983		Portion of Data Used		
	Release Time	Start	Time After L+0 (min)	Altitude m (ft)	End
FPS-16 Jimsphere	11:50	17	6 (21)	17	16,764 (55,000)
MSS Rawinsonde (Datasonde)	11:37	4	17,069 (56,000)	60	23,165 (76,000)
Super-Loki Rocketsonde (Datasonde)	13:40	127	29,870 (98,000)	146	23,470 (77,000)
Super-Loki Rocketsonde (Robin)	12:35	62	79,858 (262,000)	63	30,175 (99,000)
				73	

*The L-0 Rawinsonde released from CCAFS was used to estimate the upper atmosphere for Acoustic/SRB descent/impact analyses.

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 2. SURFACE OBSERVATIONS AT STS-7 LAUNCH TIME

Location ^a	Time After L+0 (min)	Pressure (MSL) N/cm ² (psia)	Temperature °K (°F)	Dew Point °K (°F)	Relative Humidity (%)	Visibility km (miles)	Sky Cover		Wind		
							Cloud** Amount	Cloud Type	Height of Base Meters (ft)	Speed ft/sec (kt)	Direction (deg)
NASA Space Shuttle Runway ^e	0	10.152 (14.724)	297.0 (75.0)	294.8 (71.0)	87	16 (10)	4	Cumulus	792 (2,600)	5.1 (3.0)	320
Winds Measured at 10.4 m (34 ft)							2	Strato-Cumulus	1524 (5,000)		
CAFS ^c	0	10.146 (14.716)	295.9 (73.0)	293.7 (69.0)	88	16 (10)	4 2	Cumulus-Strato-Cumulus	914 (3,000)		
Surface Measurements									2743 (9,000)		
Pad 39A Lightpole ^d	0	10.146* (14.716)	298.2 (77.2)	294.5 (70.5)	80	-	-	-	-	5.9 ^b	10 ^b
SE 18 3 m (60.0 ft)											(3.5)
Pad 39A FSS	0	-	-	-	-	-	-	-	-	10.3 ^b	350 ^b
(Top-SE) 83.8 m (275 ft)											(6.1)

ORIGINAL PAGE IS
OF POOR QUALITY

*Pad 39A Camera Site 3 barometric pressure instrument appeared to be reading too low. Therefore, the KSC Shuttle runway station pressure value interpolated to 10.146 N/cm² at 21 ft above MSL would be more appropriate as the L+0 pad atmospheric pressure measurement.

**Six-tenths total sky cover.

- a. Altitudes of measurements are above natural grade, except where noted.
- b. Approximately 10 sec. average prior to L+0.
- c. Balloon release site.
- d. Pad 39A thermodynamic measurements are taken at camera site No. 3, approximately 6.4 m (21 ft) above MSL.
- e. Official STS-7 sky observational site.

TABLE 3. STS-7 PRE-LAUNCH THROUGH LAUNCH KSC PAD 39A METEOROLOGICAL MEASUREMENTS*

18 June 1983 Time UT	Temp. (°F)	Dew Point (°F)	RH (%)	Hourly Atmospheric Measurements				Sky Condition				Other Remarks
				275' Level (SE)**		60' Level (SE)**		Clouds				
				WS	Kt	WD°	WS	Kt	WD°			
0500	78	67	69	3	080	11	073	1/10	CU at 2,500 ft	1/10	10	
0600	76	66	70	8	080	7	100	1/10	CU at 2,500 ft	1/10	10	
0700	76	67	73	8	090	6	100	clear skys		0/10	10	
0800	76	68	76	10	080	7	080	2/10 CU at 2,000 ft		2/10	10	
0900	76	68	76	10	070	6	070	1/10 CU at 2,000 ft		1/10	10	
1000	76	69	79	8	045	5	045	2/10 CU at 2,000 ft		4/10	10	
1100	76	71	85	9	040	6	045	4/10 CU at 2,200 ft		6/10	10	
L+0*** 1133	77	71	80	6	350	4	010	2/10 SC at 5,000 ft		2/10	10	
								4/10 CU at 2,600 ft		6/10	10	
								2/10 SC at 5,000 ft				

*Hourly observations obtained verbally from CCAFS.

**10 min mean about the hour from pad 39A instrumentation.

**L+0 PAD Wind and thermodynamic parameters obtained from HOSC strip charts. SE Anemometers used at 60 and 275 ft levels for L+0 wind conditions (approximately 10 sec average prior to L+0). Pad 39A L+0 atmospheric pressure, at 21 ft (MSL), was 10.146 N/cm². Sea level pressure was 10.152 N/cm².

ORIGINAL PAGE IS OF POOR QUALITY

TABLE 4. STS-7 FINAL L+0 ASCENT METEOROLOGICAL DATA TAPE

ALTIMETER IFT	WIND SPEED (FT/SEC)	WIND DIRECTION, (ULG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
00021	001	030	25.1	*1015*04	*1179*04	21.4
00100	007	360	24.9	*1012*04	*1171*04	21.3
00200	009	357	24.7	*1008*04	*1168*04	21.2
00300	009	010	24.5	*1005*04	*1165*04	21.1
00400	004	070	24.3	*1001*04	*1161*04	21.1
00500	006	040	24.1	*0976*03	*1158*04	21.0
00600	106	062	23.9	*0941*03	*1155*04	20.9
00700	009	278	23.6	*0906*03	*1152*04	20.9
00800	005	087	23.4	*0871*03	*1149*04	20.7
00900	006	063	23.2	*0836*03	*1145*04	20.6
01000	008	068	23.0	*0802*03	*1142*04	20.5
01100	007	679	22.7	*0768*03	*1139*04	20.4
01200	008	066	22.4	*0734*03	*1137*04	20.3
01300	006	061	22.2	*0701*03	*1134*04	20.2
01400	004	056	21.9	*0667*03	*1131*04	20.1
01500	009	068	21.6	*0634*03	*1126*04	20.0
01600	009	070	21.3	*0601*03	*1125*04	19.9
01700	007	073	21.0	*0568*03	*1123*04	19.8
01800	006	062	20.8	*0535*03	*1120*04	19.7
01900	007	089	20.5	*0502*03	*1117*04	19.6
02000	009	053	20.2	*0469*03	*1114*04	19.5
02100	010	066	20.0	*0436*03	*1111*04	19.3
02200	009	066	19.8	*0413*03	*1108*04	19.1
02300	007	070	19.7	*0370*03	*1105*04	18.9
02400	007	051	19.5	*0337*03	*1102*04	18.7
02500	010	053	19.3	*0304*03	*1099*04	18.6
02600	011	058	19.1	*0271*03	*1096*04	18.5
02700	012	063	18.9	*0239*03	*1092*04	18.2
02800	008	075	18.8	*0206*03	*089*04	18.0
02900	011	077	18.6	*0174*03	*106*04	17.8
03000	011	086	18.4	*0141*03	*103*04	17.6
03100	011	051	18.2	*0109*03	*100*04	17.3
03200	011	060	18.1	*0077*03	*1077*04	17.1
03300	010	059	17.9	*0045*03	*1074*04	16.9
03400	008	061	17.7	*0013*03	*1071*04	16.7
03500	006	051	17.5	*0981*03	*1069*04	16.4
03600	010	058	17.4	*0949*03	*1065*04	16.0
03700	011	070	17.2	*0917*03	*1062*04	15.7
03800	011	060	17.0	*0886*03	*1059*04	15.4
03900	012	058	16.9	*0854*03	*1055*04	15.2
04000	012	071	16.7	*0823*03	*1053*04	15.0
04100	013	077	16.5	*0792*03	*1050*04	14.5
04200	015	077	16.4	*0760*03	*1047*04	14.2
04300	020	076	16.2	*0729*03	*1044*04	13.8
04400	015	079	16.0	*0698*03	*1041*04	13.5
04500	018	066	15.9	*0667*03	*1038*04	13.1
04600	018	071	15.7	*0636*03	*1035*04	12.7
04700	020	075	15.5	*0605*03	*1032*04	12.4
04800	019	068	15.3	*0575*03	*1029*04	12.0
04900	019	068	15.2	*0544*03	*1026*04	11.7

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
005000	0.21	063	15.0	.8514+03	.0023+04	11.3
005100	0.18	063	14.9	.8483+03	.0020+04	11.2
005200	0.22	066	14.7	.8453+03	.0017+04	11.1
005300	0.21	064	14.6	.8422+03	.0014+04	11.0
005400	0.17	074	14.4	.8392+03	.0011+04	10.9
005500	0.18	079	14.3	.8362+03	.0008+04	10.8
005600	0.19	070	14.1	.8332+03	.0005+04	10.7
005700	0.14	065	14.0	.8302+03	.0001+04	10.6
005800	0.13	070	13.8	.8272+03	.9984+03	10.5
005900	0.11	047	13.7	.8243+03	.9954+03	10.4
006000	0.12	051	13.5	.8213+03	.9924+03	10.3
006100	0.10	040	13.5	.8183+03	.9894+03	9.5
006200	0.15	042	13.6	.8154+03	.9855+03	8.8
006300	0.20	044	13.6	.8125+03	.9821+03	8.0
006400	0.21	045	13.7	.8096+03	.9786+03	7.2
006500	0.23	041	13.7	.8067+03	.9752+03	6.5
006600	0.22	044	13.7	.8038+03	.9718+03	5.7
006700	0.23	040	13.8	.8009+03	.9684+03	4.9
006800	0.25	044	13.8	.7980+03	.9649+03	4.1
006900	0.22	043	13.9	.7951+03	.9615+03	3.4
007000	0.22	042	13.9	.7923+03	.9581+03	2.6
007100	0.21	044	13.7	.7894+03	.9554+03	2.2
007200	0.20	037	13.5	.7866+03	.9526+03	1.7
007300	0.22	039	13.3	.7837+03	.9499+03	1.3
007400	0.19	038	13.1	.7809+03	.9472+03	.9
007500	0.19	038	13.0	.7781+03	.9445+03	.5
007600	0.17	043	12.8	.7753+03	.9418+03	0
007700	0.16	037	12.6	.7725+03	.9391+03	-4
007800	0.21	033	12.4	.7697+03	.9364+03	-8
007900	0.20	035	12.0	.7659+03	.9337+03	-1.3
008000	0.16	033	12.0	.7641+03	.9310+03	-1.7
008100	0.19	033	11.9	.7613+03	.9280+03	-2.4
008200	0.17	038	11.8	.7586+03	.9251+03	-3.0
008300	0.17	031	11.7	.7558+03	.9221+03	-3.7
008400	0.17	041	11.6	.7531+03	.9191+03	-4.3
008500	0.12	053	11.6	.7503+03	.9162+03	-5.0
008600	0.11	042	11.5	.7476+03	.9132+03	-5.7
008700	0.13	044	11.4	.7449+03	.9103+03	-6.3
008800	0.11	049	11.3	.7422+03	.9073+03	-7.0
008900	0.14	029	11.2	.7395+03	.9044+03	-7.6
009000	0.14	033	11.1	.7368+03	.9015+03	-8.3
009100	0.14	041	11.0	.7341+03	.8986+03	-8.6
009200	0.12	044	10.8	.7314+03	.8958+03	-9.0
009300	0.11	028	10.7	.7288+03	.8930+03	-9.3
009400	0.14	032	10.6	.7261+03	.8902+03	-9.6
009500	0.12	047	10.5	.7235+03	.8873+03	-9.9
009600	0.10	039	10.3	.7208+03	.8845+03	-10.3
009700	0.12	044	10.2	.7182+03	.8817+03	-10.6
009800	0.12	051	10.1	.7156+03	.8790+03	-10.9
009900	0.09	036	9.9	.7130+03	.8762+03	-11.3

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT./SEC.)	WIND DIRECTION (DEG.)	TEMPERATURE (DEG. C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG. C)
010900	012	023	9.8	.7104+03	.8734+03	-11.6
011000	008	042	9.6	.7077+03	.8707+03	-11.5
0110200	008	029	9.5	.7051+03	.8680+03	-11.4
0110300	011	029	9.3	.7026+03	.8654+03	-11.3
0110400	011	037	9.1	.7000+03	.8627+03	-11.2
0110500	008	023	9.0	.6974+03	.8600+03	-11.1
0110600	008	020	8.9	.6949+03	.8574+03	-11.1
0110700	009	039	8.9	.6923+03	.8547+03	-11.0
0110800	003	357	8.4	.6898+03	.8521+03	-10.9
0110900	005	003	8.3	.6872+03	.8495+03	-10.8
0111000	001	331	8.1	.6847+03	.8468+03	-10.7
0111100	003	290	7.9	.6822+03	.8442+03	-10.7
0111200	005	345	7.8	.6797+03	.8415+03	-10.6
0111300	002	350	7.6	.6772+03	.8388+03	-10.6
0111400	003	321	7.5	.6747+03	.8362+03	-10.6
0111500	004	022	7.3	.6722+03	.8335+03	-10.6
0111600	003	065	7.2	.6697+03	.8309+03	-10.5
0111700	003	046	7.0	.6672+03	.8283+03	-10.5
0111800	006	046	6.9	.6648+03	.8256+03	-10.5
0111900	004	095	6.8	.6623+03	.8230+03	-10.4
0112000	002	032	6.6	.6599+03	.8204+03	-10.4
0112100	002	094	6.4	.6574+03	.8180+03	-10.4
0112200	001	132	6.2	.6550+03	.8156+03	-11.1
0112300	001	040	6.0	.6526+03	.8132+03	-11.5
0112400	002	086	5.8	.6501+03	.8108+03	-11.9
0112500	001	331	5.6	.6477+03	.8084+03	-12.2
0112600	001	027	5.4	.6453+03	.8060+03	-12.6
0112700	001	328	5.2	.6429+03	.8036+03	-13.0
0112900	004	320	5.0	.6405+03	.8012+03	-13.4
0112900	002	321	4.8	.6382+03	.7988+03	-13.7
0113000	007	301	4.6	.6358+03	.7965+03	-14.1
0113100	007	309	4.5	.6334+03	.7938+03	-14.5
0113200	007	289	4.4	.6311+03	.7912+03	-14.9
0113300	011	294	4.3	.6287+03	.7885+03	-15.3
0113400	010	311	4.2	.6264+03	.7859+03	-15.7
0113500	012	297	4.1	.6240+03	.7833+03	-16.1
0113600	012	319	4.0	.6217+03	.7806+03	-16.6
0113700	007	291	3.9	.6194+03	.7780+03	-17.0
0113800	007	294	3.8	.6171+03	.7754+03	-17.1
0113900	008	321	3.7	.6147+03	.7728+03	-17.6
0114000	005	314	3.6	.6124+03	.7702+03	-18.2
0114100	007	319	3.4	.6102+03	.7680+03	-17.8
0114200	007	334	3.1	.6079+03	.7658+03	-17.5
0114300	005	315	2.9	.6056+03	.7635+03	-17.1
0114400	008	333	2.6	.6033+03	.7613+03	-16.7
0114500	005	348	2.4	.6010+03	.7591+03	-16.4
0114600	005	327	2.2	.5988+03	.7568+03	-16.0
0114700	005	345	1.9	.5965+03	.7546+03	-15.6
0114800	003	320	1.7	.5943+03	.7524+03	-15.2
0114900	004	300	1.4	.5921+03	.7502+03	-14.9

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT.)	MIND SPEED (FT./SEC.)	MIND DIRECTION (DEG.)	TEMPERATURE (DEG C.)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)
015000	003	344	1.2	.5898+03	.7480+03
015100	001	272	1.0	.5876+03	.7456+03
015200	003	296	.9	.5854+03	.7432+03
015300	002	253	.8	.5832+03	.7408+03
015400	006	242	.6	.5810+03	.7385+03
015500	005	259	.5	.5788+03	.7361+03
015600	007	237	.3	.5766+03	.7337+03
015700	006	261	.2	.5744+03	.7314+03
015800	006	262	.0	.5722+03	.7290+03
015900	008	282	-.1	.5701+03	.7267+03
016000	008	290	-.3	.5679+03	.7243+03
016100	009	268	-.4	.5658+03	.7219+03
016200	009	276	-.6	.5636+03	.7195+03
016300	012	269	-.7	.5615+03	.7172+03
016400	011	275	-.8	.5593+03	.7148+03
016500	010	263	-.9	.5572+03	.7124+03
016600	011	266	-.1	.5551+03	.7100+03
016700	010	254	-.1	.5530+03	.7077+03
016800	013	247	-.2	.5502+03	.7053+03
016900	012	248	-.5	.5488+03	.7030+03
017000	013	234	-.1	.5467+03	.7007+03
017100	013	245	-.1	.5446+03	.6985+03
017200	011	238	-.2	.5425+03	.6964+03
017300	013	234	-.2	.5404+03	.6942+03
017400	011	234	-.4	.5384+03	.6921+03
017500	012	223	-.6	.5363+03	.6900+03
017600	010	233	-.2	.5343+03	.6879+03
017700	009	229	-.3	.5322+03	.6858+03
017800	011	238	-.3	.5302+03	.6837+03
017900	009	243	-.3	.5282+03	.6816+03
018000	011	237	-.6	.5261+03	.6795+03
018100	010	248	-.7	.5241+03	.6772+03
018200	009	237	-.3	.5221+03	.6750+03
018300	010	250	-.4	.5201+03	.6727+03
018400	009	248	-.4	.5181+03	.6705+03
018500	011	244	-.4	.5161+03	.6683+03
018600	010	250	-.4	.5141+03	.6661+03
018700	011	247	-.4	.5121+03	.6639+03
018800	013	267	-.4	.5102+03	.6617+03
018900	012	265	-.4	.5082+03	.6595+03
019000	015	269	-.5	.5062+03	.6573+03
019100	014	273	-.5	.5043+03	.6552+03
019200	015	274	-.5	.5023+03	.6531+03
019300	017	281	-.5	.5004+03	.6510+03
019400	014	278	-.5	.4984+03	.6490+03
019500	015	281	-.5	.4965+03	.6469+03
019600	014	281	-.6	.4946+05	.6448+03
019700	015	272	-.6	.4927+03	.6428+03
019800	017	282	-.6	.4908+03	.6407+03
019900	015	281	-.6	.4889+03	.6387+03

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
020000	017	279	-6.8	9870+03	6.366+03	-28.6
020100	015	274	-7.0	4851+03	6.347+03	-29.0
020200	015	270	-7.2	4832+03	6.327+03	-29.2
020300	018	274	-7.4	4813+03	6.307+03	-29.3
020400	015	273	-7.6	4794+03	6.288+03	-29.5
020500	019	277	-7.8	4775+03	6.268+03	-29.7
020600	018	282	-8.1	4757+03	6.249+03	-29.9
020700	018	273	-8.3	4738+03	6.230+03	-30.1
020800	018	282	-8.5	4720+03	6.210+03	-30.2
020900	017	279	-8.7	4701+03	6.191+03	-30.4
021000	018	281	-8.9	4683+03	6.171+03	-30.6
021100	015	274	-9.1	4665+03	6.152+03	-30.8
021200	019	279	-9.3	4646+03	6.133+03	-30.9
021300	017	287	-9.6	4628+03	6.114+03	-31.1
021400	016	279	-9.8	4610+03	6.095+03	-31.3
021500	017	288	-10.0	4592+03	6.077+03	-31.4
021600	016	282	-10.2	4574+03	6.058+03	-31.6
021700	016	281	-10.4	4556+03	6.039+03	-31.8
021800	016	277	-10.7	4538+03	6.020+03	-32.0
021900	017	272	-10.9	4520+03	6.002+03	-32.1
022000	017	280	-11.1	4502+03	5.983+03	-32.3
022100	018	278	-11.3	4484+03	5.965+03	-32.4
022200	020	287	-11.6	4467+03	5.947+03	-32.6
022300	020	285	-11.8	4449+03	5.929+03	-32.7
022400	022	289	-12.1	4431+03	5.912+03	-32.9
022500	021	287	-12.3	4414+03	5.894+03	-33.0
022600	023	293	-12.6	4396+03	5.876+03	-33.2
022700	022	293	-12.8	4379+03	5.858+03	-33.3
022800	023	289	-13.1	4361+03	5.841+03	-33.5
022900	023	287	-13.3	4344+03	5.823+03	-33.6
023000	024	280	-13.6	4327+03	5.806+03	-33.8
023100	027	281	-13.8	4309+03	5.788+03	-33.1
023200	025	279	-14.1	4292+03	5.770+03	-32.4
023300	027	279	-14.3	4275+03	5.752+03	-31.7
023400	027	284	-14.6	4258+03	5.734+03	-31.0
023500	029	279	-14.8	4241+03	5.716+03	-30.3
023600	030	284	-15.0	4224+03	5.698+03	-29.7
023700	028	284	-15.3	4207+03	5.681+03	-29.0
023800	029	285	-15.5	4190+03	5.663+03	-28.3
023900	027	283	-15.8	4173+03	5.645+03	-27.6
024000	030	281	-16.0	4157+03	5.628+03	-26.9
C24100	028	282	-16.2	4140+03	5.609+03	-26.6
024200	029	280	-16.4	4123+03	5.591+03	-26.4
024300	027	279	-16.6	4106+03	5.572+03	-25.9
024400	027	279	-16.8	4090+03	5.554+03	-25.6
024500	029	281	-17.0	4073+03	5.536+03	-25.3
024600	026	278	-17.2	4057+03	5.518+03	-25.1
024700	028	279	-17.4	4040+03	5.500+03	-24.8
024800	029	285	-17.6	4024+03	5.482+03	-24.6
024900	028	283	-17.8	4008+03	5.464+03	-24.6

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTIMETER (IN)	WIND SPEED (FT/SEC)	MIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
025000	028	285	-18.0	10964.03	5994.03	-24.3
025100	029	281	-18.7	10959.03	59416.03	-24.4
025200	027	280	-19.0	10943.03	54011.03	-24.5
025300	028	280	-19.4	10927.03	53886.03	-24.6
025400	028	281	-19.7	10911.03	53711.03	-24.6
025500	026	279	-20.0	10895.03	53577.03	-24.7
025600	025	278	-20.4	10879.03	53424.03	-24.8
025700	025	276	-20.7	10863.03	53284.03	-24.9
025800	023	275	-21.1	10848.03	53133.03	-24.9
025900	022	273	-21.4	10832.03	52984.03	-25.0
026000	020	271	-21.6	10816.03	52811.03	-25.1
026100	019	271	-21.9	10800.03	52655.03	-25.3
026200	017	269	-22.1	10785.02	52484.03	-25.5
026300	016	266	-22.3	10769.03	52311.03	-25.7
026400	018	272	-22.5	10754.03	52144.03	-25.8
026500	017	260	-22.8	10738.03	51977.03	-26.0
026600	022	268	-23.0	10723.03	51811.03	-26.2
026700	020	262	-23.0	10707.03	51649.03	-26.4
026800	023	257	-23.2	10692.03	51484.03	-26.5
026900	019	257	-23.5	10677.03	51311.03	-26.7
027000	022	248	-23.7	10661.03	51150.03	-26.9
027100	024	257	-23.9	10646.03	50984.03	-27.1
027200	023	249	-24.2	10631.03	50822.03	-27.3
027300	026	256	-24.4	10616.03	50664.03	-27.5
027400	026	260	-24.7	10601.03	50504.03	-27.7
027500	027	259	-24.9	10586.03	50344.03	-27.9
027600	025	261	-25.1	10571.03	50180.03	-28.1
027700	028	259	-25.4	10556.03	50024.03	-28.3
027800	029	266	-25.6	10541.03	49864.03	-28.5
027900	028	266	-25.9	10527.03	49704.03	-28.7
028000	032	267	-26.1	10512.03	49544.03	-28.9
028100	032	266	-26.3	10502.03	49384.03	-29.2
028200	034	268	-26.6	10497.03	49221.03	-29.5
028300	032	269	-26.8	10482.03	49054.03	-29.7
028400	033	266	-27.0	10466.03	48874.03	-30.2
028500	032	269	-27.2	10453.03	48694.03	-30.4
028600	033	271	-27.5	10439.03	48426.03	-30.7
028700	034	269	-27.7	10424.03	48226.03	-30.9
028800	031	274	-27.9	10410.03	48042.03	-31.2
028900	032	272	-28.2	10396.03	47862.03	-31.5
029000	032	273	-28.4	10381.03	47704.03	-31.8
029100	031	269	-28.6	10361.03	47544.03	-32.0
029200	032	269	-28.8	10355.03	47378.03	-32.3
029300	031	268	-29.0	10338.03	47214.03	-32.5
029400	033	265	-29.2	10324.03	46968.03	-32.8
029500	033	268	-29.4	10310.03	46822.03	-33.1
029600	034	266	-29.7	10296.03	46682.03	-33.4
029700	036	265	-29.9	10282.03	46544.03	-33.7
029800	037	264	-30.1	10268.03	46402.03	-34.0
029900	091	259	-30.3	10254.03	46266.03	-34.3

TABLE 4. (Continued)

ALTITUDE (FT.)	WIND SPEED .FT./SEC)	WIND DIRECTION (DEG.)	TEMPERATURE (DEG. C.)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	OEN POINT (DEG. C.)
030000	039	262	-30.5	3240+03	4650+03	-33.9
030100	041	258	-30.7	3227+03	4634+03	-34.6
030200	039	266	-30.9	3213+03	4618+03	-35.3
030300	038	264	-31.0	3199+03	4602+03	-36.0
030400	037	263	-31.2	3185+03	4585+03	-36.7
030500	035	266	-31.4	3172+03	4569+03	-37.4
030600	037	268	-31.6	3158+03	4553+03	-38.1
030700	036	272	-31.8	3145+03	4537+03	-38.8
030800	035	271	-31.9	3131+03	4521+03	-39.5
030900	035	275	-32.1	3118+03	4505+03	-40.2
031000	034	273	-32.3	3105+03	4490+03	-40.9
031100	033	280	-32.5	3091+03	4474+03	-41.1
031200	032	277	-32.7	3078+03	4458+03	-41.4
031300	032	277	-32.8	3065+03	4442+03	-41.6
031400	031	276	-33.0	3051+03	4426+03	-41.9
031500	030	278	-33.2	3038+03	4410+03	-42.1
031600	027	280	-33.4	3025+03	4395+03	-42.4
031700	028	283	-33.6	3012+03	4379+03	-42.6
031800	025	285	-33.7	2999+03	4363+03	-42.9
031900	02	283	-33.9	2986+03	4348+03	-43.1
032000	026	288	-34.1	2973+03	4332+03	-43.4
032100	026	283	-34.4	2960+03	4319+03	-43.6
032200	025	285	-34.7	2948+03	4306+03	-44.3
032300	025	283	-35.1	2935+03	4293+03	-44.7
032400	022	287	-35.4	2922+03	4281+03	-45.1
032500	025	283	-35.7	2909+03	4268+03	-45.5
032600	024	286	-36.0	2897+03	4255+03	-46.0
032700	025	290	-36.3	2884+03	4242+03	-46.4
032800	023	286	-36.7	2871+03	4229+03	-46.8
032900	025	286	-37.0	2859+03	4217+03	-47.3
033000	021	289	-37.3	2847+03	4204+03	-47.7
033100	024	284	-37.5	2834+03	4190+03	-47.9
033200	022	291	-37.8	2821+03	4175+03	-48.0
033300	025	289	-38.0	2809+03	4161+03	-48.2
033400	025	298	-38.2	2797+03	4147+03	-48.4
033500	025	308	-38.4	2784+03	4132+03	-48.5
033600	027	306	-38.7	2772+03	4118+03	-48.7
033700	027	304	-38.9	2760+03	4104+03	-48.9
033800	028	310	-39.1	2748+03	4090+03	-49.1
033900	027	306	-39.4	2736+03	4076+03	-49.2
034000	027	309	-39.6	2724+03	4062+03	-49.4
034100	025	307	-39.8	2711+03	4048+03	-49.7
034200	034	301	-40.1	2699+03	4034+03	-49.9
034300	032	302	-40.3	2687+03	4020+03	-50.2
034400	033	299	-40.5	2675+03	4006+03	-50.5
034500	034	299	-40.7	2664+03	3992+03	-50.7
034600	034	293	-41.0	2652+03	3979+03	-51.0
034700	036	297	-41.2	2640+03	3965+03	-51.3
034800	039	300	-41.4	2628+03	3951+03	-51.6
034900	040	298	-41.7	2616+03	3937+03	-51.8

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

**ORIGINAL PAGE IS
OF POOR QUALITY**

ALTITUDE (FT.)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	
					DEW POINT (DEG C)	DEW POINT (DEG C)
035000	044	299	-41.9	.2605+03	.3924+03	-52.1
035100	044	297	-42.2	.2593+03	.3911+03	-52.3
035200	046	296	-42.4	.2581+03	.3898+03	-52.6
035300	047	299	-42.7	.2570+03	.3885+03	-52.8
035400	047	298	-43.0	.2558+03	.3872+03	-53.0
035500	048	299	-43.2	.2547+03	.3859+03	-53.2
035600	049	296	-43.5	.2535+03	.3846+03	-53.5
035700	051	300	-43.8	.2524+03	.3833+03	-53.7
035800	054	298	-44.1	.2513+03	.3821+03	-53.9
035900	054	298	-44.3	.2501+03	.3808+03	-54.2
036000	053	297	-44.6	.2490+03	.3795+03	-54.4
036100	056	297	-44.8	.2479+03	.3782+03	-54.6
036200	059	299	-45.1	.2468+03	.3769+03	-54.8
036300	059	297	-45.3	.2456+03	.3756+03	-55.0
036400	061	301	-45.6	.2445+03	.3743+03	-55.2
036500	063	303	-45.8	.2434+03	.3729+03	-55.3
036600	064	301	-46.0	.2423+03	.3716+03	-55.5
036700	064	303	-46.3	.2412+03	.3703+03	-55.7
036800	064	302	-46.5	.2401+03	.3691+03	-55.9
036900	063	305	-46.8	.2390+03	.3678+03	-56.1
037000	061	303	-47.0	.2379+03	.3665+03	-56.3
037100	060	304	-47.2	.2368+03	.3652+03	-56.5
037200	057	306	-47.5	.2357+03	.3639+03	-56.7
037300	059	306	-47.7	.2347+03	.3626+03	-56.9
037400	059	307	-48.0	.2336+03	.3613+03	-57.2
037500	060	306	-48.2	.2325+03	.3601+03	-57.4
037600	062	306	-48.4	.2314+03	.3588+03	-57.6
037700	060	306	-48.7	.2304+03	.3575+03	-57.8
037800	064	305	-48.9	.2293+03	.3563+03	-58.1
037900	064	307	-49.2	.2283+03	.3550+03	-58.3
038000	060	308	-49.4	.2272+03	.3538+03	-58.5
038100	060	313	-49.5	.2262+03	.3523+03	-58.6
038200	056	314	-49.6	.2251+03	.3508+03	-58.7
038300	054	312	-50.2	.2241+03	.3493+03	-58.8
038400	055	314	-50.3	.2179+03	.3407+03	-58.9
038500	055	312	-50.4	.2230+03	.3479+03	-59.0
038600	057	316	-50.6	.2220+03	.3464+03	-59.1
038700	054	317	-50.1	.2200+03	.3455+03	-59.2
038800	054	312	-50.2	.2189+03	.3421+03	-59.3
038900	055	314	-51.1	.2179+03	.3407+03	-59.4
039000	053	314	-51.3	.2169+03	.3392+03	-59.5
039100	052	316	-51.5	.2159+03	.3380+03	-59.6
039200	052	319	-50.9	.2149+03	.3368+03	-59.7
039300	054	317	-51.1	.2139+03	.3356+03	-60.1
039400	056	317	-51.3	.2129+03	.3343+03	-60.3
039500	055	316	-52.0	.2099+03	.3319+03	-60.7
039600	055	318	-52.2	.2090+02	.3307+03	-61.2
039700	057	321	-51.9	.2119+03	.3319+03	-61.4
039800	058	319	-52.2	.2090+02	.3295+03	-61.4
039900	060	318	-52.5	.2080+03	.3283+03	-61.4

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	Dew Point (DEG C)
040000	063	317	52.7	2070+03	3271+03	-61.6
040100	064	316	53.0	2060+03	3260+03	-61.6
040200	068	318	53.2	2051+03	3249+03	-62.1
040300	071	318	53.5	2041+03	3237+03	-62.3
040400	067	322	53.8	2031+03	3226+03	-62.6
040500	066	323	54.0	2022+03	3215+03	-62.8
040600	066	323	54.3	2012+03	3203+03	-63.1
040700	062	323	54.6	2003+03	3192+03	-63.3
040800	060	325	54.9	1993+03	3181+03	-63.6
040900	058	322	55.1	1984+03	3170+03	-63.8
041000	052	322	55.4	1975+03	3159+03	-64.1
041100	051	320	55.4	1965+03	3145+03	-64.2
041200	045	319	55.5	1956+03	3130+03	-64.3
041300	047	316	55.5	1947+03	3116+03	-64.4
041400	047	312	55.6	1937+03	3102+03	-64.5
041500	053	313	55.6	1928+03	3088+03	-64.5
041600	043	310	55.7	1919+03	3074+03	-64.6
041700	044	313	55.7	1910+03	3060+03	-64.7
041800	043	307	55.8	1901+03	3047+03	-64.7
041900	043	313	55.8	1892+03	3033+03	-64.8
042000	042	309	55.9	1883+03	3019+03	-64.9
042100	046	303	56.0	1874+03	3006+03	-65.0
042200	046	308	56.1	1865+03	2993+03	-65.1
042300	042	314	56.2	1856+03	2980+03	-65.1
042400	044	308	56.3	1847+03	2967+03	-65.2
042500	045	305	56.4	1838+03	2955+03	-65.3
042600	045	310	56.5	1830+03	2942+03	-65.4
042700	043	308	56.6	1821+03	2929+03	-65.5
042800	047	305	56.7	1812+03	2917+03	-65.5
042900	046	300	56.8	1804+03	2904+03	-65.6
043000	045	299	56.9	1795+03	2892+03	-65.7
043100	044	301	57.0	1786+03	2880+03	-65.8
043200	043	302	57.2	1778+03	2868+03	-66.0
043300	039	299	57.3	1769+03	2856+03	-66.1
043400	043	293	58.2	1761+03	2845+03	-66.3
043500	045	296	57.6	1752+03	2833+03	-66.4
043600	046	297	57.8	1749+03	2821+03	-66.6
043700	046	299	57.9	1736+03	2810+03	-66.7
043800	045	296	58.1	1727+03	2798+03	-66.9
043900	046	293	58.2	1719+03	2787+03	-67.0
044000	050	293	58.4	1711+03	2775+03	-67.2
044100	045	291	58.5	1703+03	2764+03	-67.9
044200	046	290	58.7	1694+03	2752+03	-69.9
044300	049	290	58.8	1686+03	2741+03	-69.9
044400	046	288	59.0	1678+03	2729+03	-69.9
044500	052	289	59.1	1662+03	2718+03	-69.9
044600	042	286	59.2	1654+03	2707+03	-69.9
044700	054	282	59.4	1646+03	2695+03	-69.9
044800	055	282	59.5	1638+03	2684+03	-69.9
044900	058	281	59.7	1638+03	2673+03	-69.9

TABLE 4. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT./SEC.)	WIND DIRECTION (DEG.)	TEMPERATURE (DEG. C.)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG. C.)
045000	064	279	-59.8	.1630+03	.2662+03	-9999.
045100	064	279	-59.9	.1622+03	.2650+03	-9999.
045200	065	278	-60.0	.1614+03	.2638+03	-9999.
045300	070	277	-60.1	.1607+03	.2627+03	-9999.
045400	075	276	-60.2	.1599+03	.2615+03	-9999.
045500	072	271	-60.2	.1591+03	.2603+03	-9999.
045600	073	279	-50.3	.1583+03	.2592+03	-9999.
045700	072	278	-60.4	.1576+03	.2580+03	-9999.
045800	072	279	-60.5	.1568+03	.2569+03	-9999.
045900	076	278	-60.6	.1560+03	.2558+03	-9999.
046000	070	282	-60.7	.1553+03	.2546+03	-9999.
046100	074	282	-60.7	.1545+03	.2534+03	-9999.
046200	072	287	-60.8	.1538+03	.2523+03	-9999.
046300	067	288	-60.8	.1530+03	.2511+03	-9999.
046400	063	289	-60.9	.1522+03	.2499+03	-9999.
046500	062	292	-60.9	.1515+03	.2487+03	-9999.
046600	058	293	-60.9	.1508+03	.2476+03	-9999.
046700	061	291	-61.0	.1501+03	.2464+03	-9999.
046800	064	290	-61.0	.1493+03	.2453+03	-9999.
046900	062	293	-61.1	.1486+03	.2441+03	-9999.
047000	059	295	-61.1	.1479+03	.2430+03	-9999.
047100	056	298	-61.2	.1472+03	.2419+03	-9999.
047200	051	298	-61.3	.1465+03	.2408+03	-9999.
047300	049	299	-61.4	.1457+03	.2398+03	-9999.
047400	047	301	-61.5	.1450+03	.2387+03	-9999.
047500	043	301	-61.6	.1443+03	.2377+03	-9999.
047600	038	300	-61.8	.1436+03	.2367+03	-9999.
047700	037	296	-61.9	.1429+03	.2356+03	-9999.
047800	039	289	-62.0	.1422+03	.2346+03	-9999.
047900	037	287	-62.1	.1415+03	.2336+03	-9999.
048000	039	297	-62.2	.1408+03	.2326+03	-9999.
048100	032	294	-62.3	.1401+03	.2316+03	-9999.
048200	030	287	-62.5	.1395+03	.2306+03	-9999.
048300	027	283	-62.6	.1388+03	.2297+03	-9999.
048400	030	294	-62.8	.1381+03	.2287+03	-9999.
048500	028	287	-62.9	.1374+03	.2277+03	-9999.
048600	026	287	-63.1	.1367+03	.2268+03	-9999.
048700	034	288	-63.2	.1361+03	.2258+03	-9999.
048800	028	290	-63.4	.1354+03	.2249+03	-9999.
048900	031	286	-63.5	.1347+03	.2239+03	-9999.
049000	031	293	-63.7	.1341+03	.2230+03	-9999.
049100	034	286	-63.9	.1334+03	.2221+03	-9999.
049200	032	298	-64.1	.1327+03	.2212+03	-9999.
049300	032	288	-64.2	.1321+03	.2203+03	-9999.
049400	028	292	-64.5	.1314+03	.2194+03	-9999.
049500	030	288	-64.6	.1308+03	.2185+03	-9999.
049600	026	293	-64.6	.1301+03	.2176+03	-9999.
049700	029	290	-65.0	.1295+03	.2167+03	-9999.
049800	029	285	-65.1	.1289+03	.2158+03	-9999.
049900	028	286	-65.3	.1282+03	.2149+03	-9999.

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG F)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
050000	0.32	275	-65.5	.1276+03	.2141+03	-9999.
050100	028	281	-65.6	.1270+03	.2132+03	-9999.
050200	029	272	-66.0	.1263+03	.2124+03	-9999.
050300	025	269	-66.5	.1257+03	.2116+03	-9999.
050400	023	266	-66.5	.1251+03	.2106+03	-9999.
050500	027	258	-66.6	.1244+03	.2100+03	-9999.
050600	021	253	-67.0	.1238+03	.2092+03	-9999.
050700	027	246	-67.3	.1232+03	.2086+03	-9999.
050800	020	245	-67.5	.1226+03	.2076+03	-9999.
050900	027	249	-67.8	.1220+03	.2068+03	-9999.
051000	027	246	-68.0	.1214+03	.2061+03	-9999.
051100	032	244	-68.1	.1207+03	.2051+03	-9999.
051200	023	243	-68.2	.1201+03	.2042+03	-9999.
051300	020	242	-68.3	.1195+03	.2032+03	-9999.
051400	019	247	-68.4	.1189+03	.2023+03	-9999.
051500	019	247	-68.4	.1183+03	.2014+03	-9999.
051600	024	252	-68.5	.1177+03	.2004+03	-9999.
051700	022	245	-68.6	.1171+03	.1995+03	-9999.
051800	026	242	-68.7	.1165+03	.1986+03	-9999.
051900	023	239	-68.8	.1160+03	.1977+03	-9999.
052000	028	240	-68.9	.1154+03	.1968+03	-9999.
052100	030	238	-69.1	.1148+03	.1959+03	-9999.
052200	023	245	-69.3	.1142+03	.1951+03	-9999.
052300	030	240	-69.4	.1136+03	.1943+03	-9999.
052400	032	245	-69.6	.1130+03	.1935+03	-9999.
052500	032	246	-69.8	.1125+03	.1927+03	-9999.
052600	033	247	-70.0	.1119+03	.1919+03	-9999.
052700	032	252	-70.2	.1113+03	.1911+03	-9999.
052800	035	252	-70.3	.1108+03	.1903+03	-9999.
052900	030	254	-70.5	.1102+03	.1895+03	-9999.
053000	034	254	-70.7	.1096+03	.1887+03	-9999.
053100	037	261	-70.8	.1091+03	.1879+03	-9999.
053200	034	264	-71.0	.1085+03	.1870+03	-9999.
053300	031	274	-71.1	.1080+03	.1862+03	-9999.
053400	027	276	-71.3	.1074+03	.1854+03	-9999.
053500	019	283	-71.4	.1069+03	.1846+03	-9999.
053600	026	292	-71.6	.1063+03	.1838+03	-9999.
053700	024	294	-71.7	.1058+03	.1830+03	-9999.
054300	015	278	-71.9	.1052+03	.1822+03	-9999.
054400	017	281	-72.0	.1047+03	.1814+03	-9999.
054500	019	268	-72.1	.1042+03	.1806+03	-9999.
054600	025	269	-72.2	.1036+03	.1796+03	-9999.
054700	017	261	-72.2	.1031+03	.1787+03	-9999.
054800	015	264	-72.1	.1026+03	.1777+03	-9999.
054900	017	269	-72.0	.1020+03	.1768+03	-9999.
054900	015	289	-72.0	.1005+03	.1759+03	-9999.
054900	012	313	-71.9	.1731+03	.1740+03	-9999.
				.9946+02	.1722+03	-9999.

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT./SEC.)	WIND DIRECTION (DEG.)	TEMPERATURE (DEG. C.)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG. C.)
055000	0.11	300	-71.9	.9895+02	.1713+03	-9999.
056000	0.03	330	-72.2	.9400+02	.1630+03	-9999.
057000	0.09	004	-72.0	.8929+02	.1596+03	-9999.
058000	0.18	036	-70.6	.8484+02	.1459+03	-9999.
059000	0.19	033	-68.2	.8049+02	.1371+03	-9999.
060000	0.21	059	-67.6	.7659+02	.1300+03	-9999.
061000	0.31	089	-65.8	.7295+02	.1226+03	-9999.
062000	0.29	092	-64.8	.6941+02	.1161+03	-9999.
063000	0.30	091	-64.1	.6605+02	.1010+03	-9999.
064000	0.24	087	-63.0	.6286+02	.0942+03	-9999.
065000	0.19	086	-61.3	.5986+02	.0897+02	-9999.
066000	0.19	067	-60.3	.5703+02	.0834+02	-9999.
067000	0.24	053	-59.4	.5334+02	.0856+02	-9999.
068000	0.31	061	-58.7	.5176+02	.0812+02	-9999.
069000	0.33	071	-58.7	.4935+02	.0817+02	-9999.
070000	0.35	079	-58.1	.4703+02	.0769+02	-9999.
071000	0.4	081	-57.5	.4583+02	.0729+02	-9999.
072000	0.43	085	-57.7	.4273+02	.0690+02	-9999.
073000	0.45	082	-57.2	.4074+02	.0672+02	-9999.
074000	0.6	079	-56.2	.3884+02	.0637+02	-9999.
075000	0.42	080	-55.9	.3704+02	.0593+02	-9999.
076000	0.45	083	-54.9	.3532+02	.0563+02	-9999.
077000	0.50	087	-53.2	.3372+02	.0534+02	-9999.
078000	0.35	090	-51.8	.3219+02	.0506+02	-9999.
079000	0.30	09%	-50.5	.3079+02	.0481+02	-9999.
080000	0.25	095	-49.2	.2935+02	.0456+02	-9999.
081000	0.27	089	-47.9	.2802+02	.0433+02	-9999.
082000	0.30	098	-46.5	.2675+02	.0412+02	-9999.
083000	0.33	108	-45.2	.2554+02	.0390+02	-9999.
084000	0.30	113	-44.0	.2438+02	-	-9999.
085000	0.33	C94	-42.9	.2328+02	.0352+02	-9999.
086000	0.30	109	-42.8	.2222+02	.0316+02	-9999.
087000	0.26	10%	-42.7	.2122+02	.0307+02	-9999.
088000	0.25	108	-42.6	.2026+02	.0301+02	-9999.
089000	0.30	100	-42.3	.1934+02	.0291+02	-9999.
090000	0.33	097	-41.8	.1846+02	.0281+02	-9999.
091000	0.32	075	-41.1	.1763+02	.0265+02	-9999.
092000	0.33	083	-41.0	.1683+02	.0226+02	-9999.
093000	0.30	079	-40.7	.1607+02	.0208+02	-9999.
094000	0.33	070	-39.7	.1534+02	.0228+02	-9999.
095000	0.30	069	-37.8	.1465+02	.0216+02	-9999.
096000	0.26	068	-36.0	.1398+02	.0205+02	-9999.
097000	0.30	066	-35.0	.1335+02	.0195+02	-9999.
098000	0.32	072	-34.4	.1275+02	.0185+02	-9999.
099000	0.40	071	-33.8	.1217+02	.0171+02	-9999.
100000	0.50	075	-33.3	.1160+02	.0165+02	-9999.
101000	0.57	078	-34.2	.1109+02	.0161+02	-9999.
102000	0.59	076	-33.6	.1060+02	.0159+02	-9999.
103000	0.54	065	-32.8	.1014+02	.0146+02	-9999.
104000	0.45	063	-32.0	.0976+01	.0140+02	-9999.

**ORIGINAL PAGE IS
OF POOR QUALITY**

TABLE 4. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (10EG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
105000	0.60	0.81	-33.6	.9288+01	.1350+02	-9999.
106000	0.61	0.76	-33.6	.8888+01	.1291+02	-9999.
107000	0.50	0.97	-32.1	.8495+01	.1228+02	-9999.
108000	0.42	0.92	-30.9	.8132+01	.1169+02	-9999.
109000	0.45	0.78	-31.1	.7765+01	.1121+02	-9999.
110000	0.48	0.97	-7.4	.7451+01	.1069+02	-9999.
111000	0.60	0.86	-27.8	.7133+01	.1013+02	-9999.
112000	0.60	0.82	-26.3	.6839+01	.9649+01	-9999.
113000	0.57	0.96	-25.3	.6561+01	.9220+01	-9999.
114000	0.62	0.99	-24.4	.6292+01	.8811+01	-9999.
115000	0.52	0.98	-23.6	.6033+01	.8421+01	-9999.
116000	0.55	0.86	-22.9	.5790+01	.8059+01	-9999.
117000	0.54	0.82	-23.0	.5560+01	.7774+01	-9999.
118000	0.57	0.80	-23.3	.5339+01	.7444+01	-9999.
119000	0.62	1.06	-23.5	.5124+01	.7150+01	-9999.
120000	0.70	1.09	-23.7	.4917+01	.6867+01	-9999.
121000	0.74	1.07	-23.9	.4719+01	.6596+01	-9999.
122000	0.62	1.23	-24.2	.4531+01	.6346+01	-9999.
123000	0.57	1.07	-24.3	.4350+01	.6090+01	-9999.
124000	0.76	0.93	-23.7	.4178+01	.5835+01	-9999.
125000	0.96	0.90	-23.0	.4011+01	.5585+01	-9999.
127000	1.05	0.91	-22.2	.3846+01	.5338+01	-9999.
128000	0.69	0.90	-19.4	.3688+01	.5068+01	-9999.
129000	0.74	0.82	-16.2	.3538+01	.4797+01	-9999.
130000	0.82	0.83	-15.1	.3399+01	.4582+01	-9999.
130000F	0.66	0.69	-14.9	.3257+01	.4399+01	-9999.
131000	0.81	0.81	-14.6	.3125+01	.4211+01	-9999.
132000	0.69	0.72	-12.3	.2999+01	.4005+01	-9999.
133000	0.92	0.73	-11.2	.2861+01	.3830+01	-9999.
134000	0.91	0.65	-10.4	.2767+01	.3669+01	-9999.
135000	0.99	0.60	-9.7	.2658+01	.3514+01	-9999.
136000	1.09	0.71	-8.9	.2551+01	.3251+01	-9999.
137000	1.13	0.84	-8.2	.2446+01	.3217+01	-9999.
138000	1.08	0.93	-6.9	.2346+01	.3064+01	-9999.
139000	0.97	0.94	-4.9	.2250+01	.2922+01	-9999.
140000	0.92	0.98	-3.0	.2160+01	.2785+01	-9999.
141000	0.82	0.86	-1.3	.2075+01	.2654+01	-9999.
142000C	0.67	0.87	-1.3	.1995+01	.2557+01	-9999.
143000	0.70	0.81	-2.3	.1918+01	.2461+01	-9999.
144000	0.94	0.79	-3.2	.1843+01	.2379+01	-9999.
145000	1.23	0.86	-4.1	.1770+01	.2292+01	-9999.
146000	1.38	0.93	-3.2	.1701+01	.2196+01	-9999.
147000	1.31	0.95	-1.1	.1637+01	.2095+01	-9999.
148000	1.13	0.92	-3	.1574+01	.2010+01	-9999.
149000	1.08	0.88	-5	.1515+01	.1936+01	-9999.
150000	1.16	0.88	-8	.1457+01	.1869+01	-9999.
151000	1.31	0.90	-1.0	.1402+01	.1794+01	-9999.
152000	1.63	0.91	-1.3	.1347+01	.1727+01	-9999.
153000	1.50	0.93	-1.6	.1296+01	.1662+01	-9999.
154000	1.48	0.95	-1.8	.1247+01	.1601+01	-9999.

TABLE 4. (Continued)

ALTITUDE FT.	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
155000	105	098	-1.9	12000.01	1.1561.01	-9999.
156000	100	102	-1.7	11555.01	1.1683.01	-9999.
157000	116	106	-1.5	1112.01	1.1112.01	-9999.
158000	133	109	-1.4	1070.01	1.1426.01	-9999.
159000	151	106	-1.2	1030.01	1.1312.01	-9999.
160000	135	099	-1.1	9920.00	1.1320.01	-9999.
161000	143	092	-0.9	9549.00	1.1222.01	-9999.
162000	153	089	-0.8	9192.00	1.1192.00	-9999.
163000	160	090	-0.6	8817.00	1.1111.01	-9999.
164000	165	093	-0.8	8435.00	1.1089.01	-9999.
165000	165	096	-1.3	8198.00	1.1051.01	-9999.
166000	156	098	-1.8	7894.00	1.1014.01	-9999.
167000	152	099	-2.2	7621.00	1.1014.01	-9999.
168000	146	099	-2.7	7332.00	1.0986.00	-9999.
169000	146	099	-3.1	7051.00	1.0961.00	-9999.
170000	146	100	-3.7	6779.00	1.0939.00	-9999.
171000	148	103	-5.2	6545.00	1.0908.00	-9999.
172000	150	106	-6.3	6301.00	1.0825.00	-9999.
173000	148	112	-8.2	6064.00	1.0797.00	-9999.
174000	148	116	-9.2	5834.00	1.0768.00	-9999.
175000	146	117	-10.6	5613.00	1.0746.00	-9999.
176000	146	117	-13.9	5398.00	1.0725.00	-9999.
177000	152	115	-16.7	5182.00	1.0704.00	-9999.
178000	157	113	-15.7	4987.00	1.0674.00	-9999.
179000	165	111	-15.2	4793.00	1.0647.00	-9999.
180000	170	109	-16.8	4607.00	1.0626.00	-9999.
181000	173	107	-19.8	4427.00	1.0608.00	-9999.
182000	173	105	-21.2	4251.00	1.0587.00	-9999.
183000	173	103	-21.2	4083.00	1.0564.00	-9999.
184000	173	100	-20.2	3922.00	1.0540.00	-9999.
185000	175	098	-20.2	3767.00	1.0516.00	-9999.
186000	180	096	-18.2	3619.00	1.0495.00	-9999.
187000	185	096	-16.2	3477.00	1.0471.00	-9999.
188000	192	096	-16.2	3342.00	1.0453.00	-9999.
189000	195	096	-16.2	3212.00	1.0438.00	-9999.
190000	197	095	-22.9	3085.00	1.0429.00	-9999.
191000	195	093	-26.2	2962.00	1.0417.00	-9999.
192000	195	090	-27.2	2842.00	1.0402.00	-9999.
193000	195	087	-26.0	2727.00	1.0384.00	-9999.
194000	194	083	-26.5	2617.00	1.0366.00	-9999.
195000	204	080	-23.2	2513.00	1.0350.00	-9999.
196000	209	078	-24.2	2412.00	1.0337.00	-9999.
197000	216	077	-25.2	2330.00	1.0323.00	-9999.
198000	221	077	-26.9	2237.00	1.0316.00	-9999.
199000	226	076	-27.2	2147	1.0309.00	-9999.
200000	233	074	-27.2	2055	1.0291.00	-9999.
201000	238	079	-28.5	1975	1.0281.00	-9999.
202000	239	081	-30.0	1895.00	1.0271.00	-9999.
203000	241	082	-32.9	1816.00	1.0263.00	-9999.
204000	241	084	-35.9	1741.00	1.0255.00	-9999.

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG.)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
20 5000	241	06	-36.6	.1667+00	.2976+00	-9999.
20 6000	239	087	-40.1	.1596+00	.2386+00	-9999.
20 7000	236	089	-40.2	.1528+00	.2215+00	-9999.
20 8000	231	091	-40.2	.1462+00	.2186+00	-9999.
20 9000	22%	093	-40.2	.1400+00	.2093+00	-9999.
21 0000	219	096	-40.2	.1340+00	.2003+00	-9999.
21 1000	212	098	-41.2	.1282+00	.1925+00	-9999.
21 2000	204	100	-42.3	.1227+00	.1851+00	-9999.
21 3000	197	103	-43.4	.1179+00	.1783+00	-9999.
21 4000	187	105	-44.3	.1123+00	.1709+00	-9999.
21 5000	177	107	-45.5	.1079+00	.1666+00	-9999.
21 6000	167	110	-47.5	.1027+00	.1585+00	-9999.
21 7000	155	111	-49.9	.9210+01	.1524+00	-9999.
21 8000	143	112	-50.6	.9370+01	.1467+00	-9999.
21 9000	130	110	-52.4	.8950+01	.1411+00	-9999.
22 0000	119	108	-54.4	.8550+01	.1362+00	-9999.
22 1000	111	103	-56.0	.8160+01	.1309+00	-9999.
22 2000	106	96	-59.2	.7790+01	.1268+00	-9999.
22 3000	106	088	-60.2	.7930+01	.1215+00	-9999.
22 4000	111	081	-61.5	.7680+01	.1166+00	-9999.
22 5000	118	075	-62.2	.6750+01	.1119+00	-9999.
22 6000	128	071	-62.6	.6420+01	.1062+00	-9999.
22 7000	136	069	-64.1	.6100+01	.1017+00	-9999.
22 8000	145	068	-67.1	.5600+01	.9806+01	-9999.
22 9000	150	067	-70.1	.5520+01	.9722+01	-9999.
23 0000	153	068	-73.2	.5250+01	.9146+01	-9999.
23 1000	155	069	-75.3	.5000+01	.8603+01	-9999.
23 2000	153	071	-78.3	.4750+01	.8492+01	-9999.
23 3000	150	073	-80.3	.4500+01	.8129+01	-9999.
23 4000	146	076	-81.2	.4270+01	.7749+01	-9999.
23 5000	141	078	-82.2	.4050+01	.7387+01	-9999.
23 6000	136	081	-92.3	.3840+01	.7004+01	-9999.
23 7000	131	084	-92.3	.3640+01	.6696+01	-9999.
23 8000	126	087	-83.2	.3460+01	.6344+01	-9999.
23 9000	123	090	-83.2	.3280+01	.6018+01	-9999.
24 0000	119	093	-83.2	.3110+01	.5702+01	-9999.
24 1000	116	096	-93.4	.2940+01	.5393+01	-9999.
24 2000	114	098	-85.0	.2790+01	.5165+01	-9999.
24 3000	113	100	-85.2	.26+01	.4911+01	-9999.
24 4000	111	102	-85.2	.2510+01	.4651+01	-9999.
24 5000	111	104	-85.5	.2380+01	.4419+01	-9999.
24 6000	109	105	-87.1	.2250+01	.4212+01	-9999.
24 7000	109	106	-88.6	.2130+01	.4020+01	-9999.
24 8000	109	107	-91.1	.2010+01	.3845+01	-9999.
24 9000	109	107	-92.6	.1900+01	.3667+01	-9999.
25 0000	109	107	-93.2	.1800+01	.3484+01	-9999.
25 1000	109	107	-94.7	.1700+01	.3318+01	-9999.
25 2000	109	107	-96.2	.1610+01	.3170+01	-9999.
25 3000	108	106	-97.2	.1520+01	.3009+01	-9999.
25 4000	108	105	-98.2	.1430+01	.2847+01	-9999.

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT./SEC.)	WIND DIRECTION (DEG.)	TEMPERATURE (DEG. C.)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEN POINT (DEG. C.)	
255000	108	104	-98.2	.1360-01	.2701-01	9999.	
256000	108	103	-99.2	.1260-01	.2563-01	9999.	
257000	106	102	-99.2	.1210-01	.2423-01	9999.	
258000	106	101	-99.3	.1140-01	.2285-01	9999.	
259000	104	099	-100.2	.1080-01	.2175-01	9999.	
260000	104	098	-100.2	.1010-01	.2036-01	9999.	
261000	103	096	-100.2	.9600-02	.1932-01	9999.	
262000	103	094	-99.9	.9000-02	.1809-01	9999.	
263000	095	092	-99.1	.8657-02	.1740-01	9999.	
264000	088	090	-98.3	.8326-02	.1674-01	9999.	
265000	080	089	-97.5	.8011-02	.1610-01	9999.	
266000	073	086	-96.7	.7706-02	.1549-01	9999.	
267000	065	083	-95.9	.7413-02	.1490-01	9999.	
268000	058	080	-95.1	.7131-02	.1436-01	9999.	
269000	052	075	-94.3	.6859-02	.1379-01	9999.	
270000	045	069	-93.5	.6598-02	.1326-01	9999.	
271000	040	062	-92.8	.6347-02	.1276-01	9999.	
272000	035	052	-92.0	.6106-02	.1227-01	9999.	
273000	031	039	-91.2	.5971-02	.1181-01	9999.	
274000	030	024	-90.4	.5650-02	.1136-01	9999.	
275000	030	009	-89.6	.5525-02	.1093-01	9999.	
276000	033	355	-88.8	.5226-02	.1051-01	9999.	
277000	031	344	-88.0	.4929-02	.1011-01	9999.	
286000	036	334	-86.9	.4629-02	.9643-02	9999.	
28	10	035	322	-89.6	.3617-02	.6844-02	9999.
28	10	035	309	-90.4	.3064-02	.5823-02	9999.
289000	036	296	-91.1	.2595-02	.4954-02	9999.	
292000	040	285	-91.9	.2198-02	.4215-02	9999.	
295000	049	276	-92.6	.1862-02	.3587-02	9999.	
298000	075	273	-91.5	.1597-02	.3046-02	9999.	
301000	114	271	-90.1	.1352-02	.2556-02	9999.	
304000	157	270	-88.6	.1145-02	.2143-02	9999.	
307000	204	270	-87.2	.9692-03	.1798-02	9999.	
310000	249	270	-85.8	.8206-03	.1507-02	9999.	
313000	277	269	-84.0	.6985-03	.1266-02	9999.	
316000	283	269	-81.9	.5986-03	.1071-02	9999.	
319000	281	269	-79.7	.5130-03	.9041-03	9999.	
322000	270	269	-77.5	.4395-03	.7636-03	9999.	
325000	249	269	-75.3	.3765-03	.6446-03	9999.	
328000	201	269	-73.1	.3225-03	.5443-03	9999.	
331000	203	269	-69.5	.2790-03	.4616-03	9999.	
334000	202	269	-65.9	.2414-03	.3912-03	9999.	
337000	195	269	-62.3	.2088-03	.3317-03	9999.	
340000	177	269	-58.7	.1805-03	.2812-03	9999.	
343000	148	269	-55.1	.1560-03	.2385-03	9999.	
346000	128	268	-50.3	.1363-03	.2032-03	9999.	
349000	128	268	-44.3	.1203-03	.1741-03	9999.	
352000	125	267	-38.2	.1061-03	.1491-03	9999.	
355000	116	266	-32.2	.9352-04	.1277-03	9999.	
358000	101	264	-26.2	.8237-04	.1094-03	9999.	

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
361000	079	265	-20.0	.7258-04	.9378-04	-9999.
364000	079	263	-11.0	.6562-04	.8159-04	-9999.
367000	078	261	-1.9	.5925-04	.7098-04	-9999.
370000	075	258	7.2	.5344-04	.6175-04	-9999.
373000	069	254	16.3	.4815-04	.5372-04	-9999.
376000	061	246	25.3	.4334-04	.4673-04	-9999.
379000	050	254	35.1	.3932-04	.4093-04	-9999.
382000	048	251	45.6	.3599-04	.3612-04	-9999.
385000	045	248	56.3	.3309-04	.3198-04	-9999.
388000	043	244	67.3	.3042-04	.2841-04	-9999.
391000	040	239	78.6	.2809-04	.2531-04	-9999.
394000	038	234	90.1	.2601-04	.2263-04	-9999.
397000	037	228	101.8	.2414-04	.2029-04	-9999.
400000	035	221	113.6	.2245-04	.1825-04	-9999.

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 5. STS-7 FINAL ACOUSTIC/SRB DESCENT METEOROLOGICAL DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
000015	003	060	31.7	*1014+04	*1145+04	25.1
001000	007	054	25.0	*9803+03	*1136+04	19.2
002000	007	063	21.0	*9469+03	*1113+04	16.7
003000	013	081	18.4	*9141+03	*1085+04	14.9
004000	017	075	16.7	*8823+03	*1053+04	14.2
005000	016	073	15.0	*8514+03	*1023+04	11.6
006000	021	057	13.5	*8213+03	*9928+03	9.2
007000	020	048	13.9	*7923+03	*9581+03	2.6
008000	016	044	12.0	*7641+03	*9310+03	-1.7
009000	013	041	11.1	*7368+03	*9015+03	-8.3
010000	011	038	9.8	*7103+03	*8734+03	-11.6
011000	005	023	8.1	*6847+03	*8468+03	-10.7
012000	003	026	6.6	*6599+03	*8204+03	-10.4
013000	005	301	4.6	*6358+03	*7965+03	-14.1
014000	008	317	3.6	*6124+03	*7702+03	-18.2
015000	005	284	1.2	*5898+03	*7480+03	-14.5
016000	011	271	-1.3	*5679+03	*7243+03	-17.4
017000	011	231	-1.6	*5467+03	*7007+03	-18.9
018000	006	238	-3.6	*5261+03	*6795+03	-21.8
019000	013	284	-5.0	*5062+03	*6573+03	-26.3
020000	017	297	-6.8	*4870+03	*6366+03	-28.8
021000	017	293	-8.9	*4683+03	*6171+03	-30.6
022000	018	289	-11.1	*4502+03	*5983+03	-32.3
023000	024	291	-13.6	*4327+03	*5806+03	-33.8
024000	027	289	-16.0	*4157+03	*5628+03	-26.9
025000	027	283	-18.0	*3992+03	*5446+03	-24.3
026000	021	264	-21.4	*3832+03	*5298+03	-25.0
027000	025	255	-23.7	*3677+03	*5131+03	-26.7
028000	030	269	-26.1	*3527+03	*4970+03	-28.7
029000	029	270	-28.4	*3381+03	*4810+03	-31.2
030000	034	263	-30.5	*3240+03	*4650+03	-33.9
031000	034	274	-32.3	*3105+03	*4490+03	-40.9
032000	030	287	-34.1	*2973+03	*4332+03	-43.4
033000	026	287	-37.3	*2846+03	*4204+03	-47.7
034000	028	297	-39.6	*2724+03	*4062+03	-49.4
035000	038	301	-41.9	*2605+03	*3924+03	-52.1
036000	052	301	-44.6	*2490+03	*3795+03	-54.4
037000	062	306	-47.0	*2379+03	*3665+03	-56.3
038000	064	310	-49.4	*2272+03	*3538+03	-58.5
039000	062	313	-50.4	*2169+03	*3392+03	-59.4
040000	060	320	-52.7	*2070+03	*3271+03	-61.6
041000	060	318	-55.4	*1974+03	*3159+03	-64.1
042000	049	311	-55.9	*1883+03	*3019+03	-64.9
043000	042	305	-56.9	*1795+03	*2892+03	-65.7
044000	042	294	-58.4	*1711+03	*2775+03	-67.2
045000	055	281	-59.6	*1630+03	*2662+03	-6999.
046000	068	281	-60.7	*1553+03	*2546+03	-6999.
047000	060	290	-61.1	*1479+03	*2430+03	-6999.
048000	041	295	-62.2	*1408+03	*2326+03	-6999.
049000	034	293	-63.7	*1341+03	*2230+03	-6999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
0500000	034	287	-65.5	+1276+03	.2141+03	-9999.
0510000	024	252	-68.0	+1213+03	.2061+03	-9999.
0520000	026	243	-68.9	+1154+03	.1968+03	-9999.
0530000	031	251	-70.7	+1096+03	.1887+03	-9999.
0540000	024	270	-72.2	+1042+03	.1806+03	-9999.
0550000	016	272	-71.9	+9895+02	.1713+03	-9999.
0560000	003	330	-72.2	+9400+02	.1630+03	-9999.
0570000	009	004	-72.0	+8929+02	.1546+03	-9999.
0580000	018	036	-70.6	+8484+02	.1459+03	-9999.
0590000	019	033	-68.2	+8064+02	.1371+03	-9999.
0600000	021	059	-67.6	+7668+02	.1300+03	-9999.
0610000	031	089	-65.8	+7295+02	.1226+03	-9999.
0620000	029	092	-64.8	+6941+02	.1161+03	-9999.
0630000	030	091	-64.1	+6605+02	.1101+03	-9999.
0640000	024	087	-63.0	+6288+02	.1042+03	-9999.
0650000	019	086	-61.3	+5988+02	.9847+02	-9999.
0660000	019	067	-60.3	+5703+02	.9334+02	-9999.
0670000	024	053	-59.4	+5434+02	.8856+02	-9999.
0680000	031	061	-58.7	+5178+02	.8412+02	-9999.
0690000	033	071	-58.7	+4935+02	.8017+02	-9999.
0700000	035	079	-58.1	+4703+02	.7619+02	-9999.
0710000	044	081	-57.5	+4463+02	.7242+02	-9999.
0720000	043	085	-57.7	+4273+02	.6909+02	-9999.
0730000	045	082	-57.2	+4074+02	.6572+02	-9999.
0740000	046	079	-56.2	+3884+02	.6237+02	-9999.
0750000	042	080	-55.9	+3704+02	.5939+02	-9999.
0760000	045	083	-54.9	+3532+02	.5638+02	-9999.
0770000	040	087	-53.2	+3372+02	.5340+02	-9999.
0780000	035	090	-51.8	+3219+02	.5067+02	-9999.
0790000	030	094	-50.5	+3074+02	.4810+02	-9999.
0800000	025	095	-49.2	+2935+02	.4565+02	-9999.
0810000	027	089	-47.9	+2802+02	.4333+02	-9999.
0820000	030	098	-46.5	+2675+02	.4112+02	-9999.
0830000	033	108	-45.2	+2554+02	.3903+02	-9999.
0840000	030	113	-44.0	+2438+02	.3706+02	-9999.
0850000	033	094	-42.9	+2328+02	.3521+02	-9999.
0860000	030	109	-42.8	+2222+02	.3360+02	-9999.
0870000	028	104	-42.7	+2122+02	.3207+02	-9999.
0880000	025	108	-42.6	+2026+02	.3061+02	-9999.
0890000	030	100	-42.3	+1934+02	.2918+02	-9999.
0900000	033	097	-41.8	+1846+02	.2781+02	-9999.
0910000	037	075	-41.4	+1763+02	.2650+02	-9999.
0920000	033	083	-41.0	+1683+02	.2526+02	-9999.
0930000	030	079	-40.7	+1607+02	.2408+02	-9999.
0940000	023	070	-39.7	+1534+02	.2289+02	-9999.
0950000	030	064	-37.8	+1465+02	.2168+02	-9999.
0960000	028	068	-36.0	+1398+02	.2054+02	-9999.
0970000	030	068	-35.0	+1335+02	.1953+02	-9999.
0980000	032	072	-34.4	+1275+02	.1859+02	-9999.
0990000	040	071	-33.8	+1217+02	.1771+02	-9999.

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 5. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT./SEC.)	WIND DIRECTION (DEG.)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
100000	050	075	-33.3	.1160+02	.1685+02	-9999.
101000	057	078	-34.2	.1104+02	.1616+02	-9999.
102000	059	076	-33.6	.1063+02	.1541+02	-9999.
103000	054	065	-32.8	.1014+02	.1469+02	-9999.
104000	045	068	-32.0	.9706+01	.1402+02	-9999.
105000	060	081	-33.6	.9288+01	.1350+02	-9999.
106000	047	076	-33.4	.8884+01	.1291+02	-9999.
107000	050	097	-32.1	.8495+01	.1228+02	-9999.
108000	042	092	-30.9	.8132+01	.1169+02	-9999.
109000	045	078	-31.1	.7785+01	.1121+02	-9999.
110000	048	097	-31.4	.7451+01	.1062+02	-9999.
111000	040	086	-27.8	.7133+01	.1013+02	-9999.
112000	040	082	-26.3	.6839+01	.9649+01	-9999.
113000	037	096	-25.3	.6561+01	.9220+01	-9999.
114000	042	099	-24.4	.6292+01	.8811+01	-9999.
115000	052	098	-23.6	.6033+01	.8422+01	-9999.
116000	045	086	-22.9	.5790+01	.8059+01	-9999.
117000	054	082	-23.0	.5560+01	.7744+01	-9999.
118000	057	080	-23.3	.5339+01	.7444+01	-9999.
119000	062	108	-23.5	.5124+01	.7150+01	-9999.
120000	070	109	-23.7	.4917+01	.6867+01	-9999.
121000	074	107	-23.9	.4719+01	.6596+01	-9999.
122000	062	123	-24.2	.4531+01	.6340+01	-9999.
123000	057	107	-24.3	.4350+01	.6090+01	-9999.
124000	076	093	-23.7	.4178+01	.5835+01	-9999.
125000	096	090	-23.0	.4011+01	.5505+01	-9999.
126000	103	091	-22.2	.3846+01	.5338+01	-9999.
127000	089	090	-19.4	.3688+01	.5068+01	-9999.
128000	074	082	-16.2	.3538+01	.4797+01	-9999.
129000	082	083	-15.1	.3394+01	.4582+01	-9999.
130000	086	089	-14.9	.3257+01	.4394+01	-9999.
131000	081	081	-14.6	.3125+01	.4211+01	-9999.
132000	089	072	-12.3	.2999+01	.4005+01	-9999.
133000	092	073	-11.2	.2881+01	.3830+01	-9999.
134000	091	065	-10.4	.2767+01	.3669+01	-9999.
135000	099	060	-9.7	.2658+01	.3514+01	-9999.
136000	109	071	-8.9	.2551+01	.3363+01	-9999.
137000	113	084	-8.2	.2446+01	.3217+01	-9999.
138000	108	093	-6.9	.2346+01	.3069+01	-9999.
139000	097	094	-4.9	.2250+01	.2922+01	-9999.
140000	092	088	-3.0	.2160+01	.2785+01	-9999.
141000	082	086	-1.3	.2075+01	.2659+01	-9999.
142000	067	087	-4.3	.1995+01	.2557+01	-9999.
143000	070	081	-2.3	.1918+01	.2467+01	-9999.
144000	094	079	-3.2	.1743+01	.2379+01	-9999.
145000	123	086	-4.1	.1770+01	.2292+01	-9999.
146000	138	093	-3.2	.1701+01	.2196+01	-9999.
147000	131	095	-1.1	.1637+01	.2054+01	-9999.
148000	113	092	-3.3	.1574+01	.2010+01	-9999.
149000	108	088	-5	.1515+01	.1936+01	-9999.

**ORIGINAL PAGE IS
OF POOR QUALITY**

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
150000	088	-8	-1.0	10794+01	-9999.	-9999.
151000	090	-1.3	-1.3	10727+01	-9999.	-9999.
152000	091	-1.6	-1.6	10662+01	-9999.	-9999.
153000	093	-1.8	-1.8	10601+01	-9999.	-9999.
154000	095	-1.9	-1.9	10541+01	-9999.	-9999.
155000	098	-1.7	-1.7	10483+01	-9999.	-9999.
156000	102	-1.5	-1.5	10426+01	-9999.	-9999.
157000	106	-1.4	-1.4	10372+01	-9999.	-9999.
158000	109	-1.2	-1.2	10320+01	-9999.	-9999.
159000	099	-1.1	-1.1	10270+01	-9999.	-9999.
160000	092	-0.9	-0.9	10222+01	-9999.	-9999.
161000	089	-0.6	-0.6	10176+01	-9999.	-9999.
162000	093	-0.8	-0.8	10131+01	-9999.	-9999.
163000	100	-1.3	-1.3	10089+01	-9999.	-9999.
164000	096	-1.8	-1.8	10051+01	-9999.	-9999.
165000	098	-2.2	-2.2	9944+00	-9999.	-9999.
166000	099	-2.7	-2.7	9909+00	-9999.	-9999.
167000	099	-3.1	-3.1	9879+00	-9999.	-9999.
168000	099	-3.7	-3.7	9825+00	-9999.	-9999.
169000	100	-5.2	-5.2	9785+00	-9999.	-9999.
170000	103	-6.3	-6.3	9744+00	-9999.	-9999.
171000	108	-8.2	-8.2	9702+00	-9999.	-9999.
172000	112	-6.2	-6.2	9661+00	-9999.	-9999.
173000	116	-10.6	-10.6	9620+00	-9999.	-9999.
174000	117	-13.9	-13.9	9579+00	-9999.	-9999.
175000	117	-16.7	-16.7	9549+00	-9999.	-9999.
176000	115	-15.7	-15.7	9498+00	-9999.	-9999.
177000	113	-15.2	-15.2	9479+00	-9999.	-9999.
178000	111	-16.8	-16.8	9460+00	-9999.	-9999.
179000	109	-19.8	-19.8	9442+00	-9999.	-9999.
180000	107	-21.2	-21.2	9425+00	-9999.	-9999.
181000	105	-21.2	-21.2	9408+00	-9999.	-9999.
182000	103	-20.2	-20.2	9392+00	-9999.	-9999.
183000	100	-20.2	-20.2	9376+00	-9999.	-9999.
184000	098	-18.2	-18.2	9361+00	-9999.	-9999.
185000	096	-16.2	-16.2	9347+00	-9999.	-9999.
186000	096	-16.2	-16.2	9334+00	-9999.	-9999.
187000	096	-18.2	-18.2	9321+00	-9999.	-9999.
188000	095	-22.9	-22.9	9308+00	-9999.	-9999.
189000	095	-26.2	-26.2	9296+00	-9999.	-9999.
190000	093	-27.2	-27.2	9284+00	-9999.	-9999.
191000	090	-26.0	-26.0	9272+00	-9999.	-9999.
192000	087	-24.5	-24.5	9261+00	-9999.	-9999.
193000	083	-23.2	-23.2	9251+00	-9999.	-9999.
194000	080	-24.2	-24.2	9241+00	-9999.	-9999.
195000	078	-25.2	-25.2	9233+00	-9999.	-9999.
196000	077	-26.9	-26.9	9223+00	-9999.	-9999.
197000	077	-27.2	-27.2	9214+00	-9999.	-9999.
198000	078					
199000						

TABLE 5. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DEW POINT (DEG C)
200000	233	078	-27.2	.2059+00	.2916+00
201000	238	079	-28.5	.1975+00	.9999.
202000	239	081	-30.0	.1895+00	.2715+00
203000	241	082	-32.9	.1816+00	.2633+00
204000	241	084	-35.9	.1741+00	.2557+00
205000	241	086	-38.6	.1667+00	.2476+00
206000	239	087	-40.1	.1596+00	.2396+00
207000	236	089	-40.2	.1528+00	.2285+00
208000	231	091	-40.2	.1462+00	.2186+00
209000	224	093	-40.2	.1400+00	.2093+00
210000	219	096	-40.2	.1340+00	.2003+00
211000	212	098	-41.2	.1282+00	.1925+00
212000	204	100	-42.3	.1227+00	.1851+00
213000	-	197	-43.8	.1174+00	.1783+00
214000	187	105	-44.3	.1123+00	.1709+00
215000	177	107	-45.8	.1074+00	.1646+00
216000	167	110	-47.5	.1027+00	.1585+00
217000	155	111	-48.9	.9810-01	.1524+00
218000	143	112	-50.6	.9370-01	.1467+00
219000	130	110	-52.2	.8950-01	.1411+00
220000	119	108	-54.4	.8550-01	.1362+00
221000	113	103	-56.0	.8160-01	.1309+00
222000	106	096	-59.2	.7790-01	.1268+00
223000	106	088	-60.2	.7430-01	.1215+00
224000	111	081	-61.5	.7080-01	.1166+00
225000	118	075	-62.2	.6750-01	.1114+00
226000	128	071	-62.6	.6420-01	.1062+00
227000	136	069	-64.1	.6100-01	.1017+00
228000	145	068	-67.1	.5800-01	.9806-01
229000	150	067	-70.1	.5520-01	.9472-01
230000	153	068	-73.2	.5250-01	.9146-01
231000	155	069	-75.3	.5000-01	.8803-01
232000	153	071	-78.3	.4750-01	.8492-01
233000	150	073	-80.3	.4500-01	.8129-01
234000	146	076	-81.2	.4270-01	.7798-01
235000	141	078	-82.2	.4050-01	.7367-01
236000	136	069	-82.2	.3840-01	.7004-01
237000	131	084	-82.3	.3640-01	.6646-01
238000	126	087	-83.2	.3460-01	.6344-01
239000	123	090	-83.2	.3280-01	.6014-01
240000	119	093	-83.2	.3110-01	.5702-01
241000	116	096	-83.4	.2940-01	.5398-01
242000	114	098	-85.0	.2790-01	.5165-01
243000	113	100	-85.2	.2650-01	.4911-01
244000	111	102	-85.2	.2510-01	.4651-01
245000	111	104	-85.5	.2380-01	.4419-01
246000	109	105	-87.1	.2250-01	.4212-01
247000	109	106	-88.6	.2130-01	.4020-01
248000	107	107	-91.1	.2010-01	.3845-01
249000	109	107	-92.6	.1900-01	.3667-01

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DEW POINT (DEG C)
250000	109	107	-93.2	*1800-01	-9999.
251000	109	107	-94.7	*1700-01	-9999.
252000	109	107	-96.2	*1610-01	-9999.
253000	108	106	-97.2	*1520-01	-9999.
254000	108	105	-98.2	*1430-01	-9999.
255000	108	104	-98.2	*1360-01	-9999.
256000	108	103	-99.2	*1280-01	-9999.
257000	106	102	-99.2	*1210-01	-9999.
258000	106	101	-99.3	*1140-01	-9999.
259000	104	099	-100.2	*1080-01	-9999.
260000	104	098	-100.2	*1010-01	-9999.
261000	103	096	-100.2	*9600-02	-9999.
262000	103	094	-99.9	*9000-02	-9999.
263000	095	092	-99.1	*8657-02	-9999.
264000	088	090	-98.3	*8328-02	-9999.
265000	080	089	-97.5	*8011-02	-9999.
266000	073	086	-96.7	*7706-02	-9999.
267000	065	083	-95.9	*7413-02	-9999.
268000	058	080	-95.1	*7131-02	-9999.
269000	052	075	-94.3	*6859-02	-9999.
270000	045	069	-93.5	*6598-02	-9999.
271000	040	062	-92.8	*6347-02	-9999.
272000	035	052	-92.0	*6106-02	-9999.
273000	031	039	-91.2	*5873-02	-9999.
274000	030	024	-90.4	*5650-02	-9999.
275000	030	009	-89.6	*5435-02	-9999.
276000	033	355	-88.8	*5226-02	-9999.
277000	017	344	-88.0	*5029-02	-9999.
280000	036	334	-88.8	*4269-02	-9999.
281000	035	322	-89.6	*3617-02	-9999.
284000	035	309	-90.4	*3064-02	-9999.
289000	036	296	-91.1	*2595-02	-9999.
292000	040	285	-91.9	*2198-02	-9999.
295000	044	276	-92.6	*1862-02	-9999.
298000	075	273	-91.5	*1597-02	-9999.
301000	114	271	-90.1	*1352-02	-9999.
304000	157	270	-86.6	*1145-02	-9999.
307000	204	285	-87.2	*2143-02	-9999.
310000	249	270	-85.6	*1798-02	-9999.
313000	277	273	-84.0	*1507-02	-9999.
316000	283	269	-81.9	*1071-02	-9999.
319000	261	269	-79.7	*5140-03	-9999.
320000	204	270	-87.2	*3912-03	-9999.
325000	245	269	-75.3	*7634-03	-9999.
328000	201	269	-73.1	*3765-03	-9999.
331000	203	269	-69.5	*3225-03	-9999.
334000	202	269	-65.9	*4614-03	-9999.
337000	195	269	-62.3	*2414-03	-9999.
340000	177	269	-58.7	*2088-03	-9999.
343000	148	268	-55.1	*2812-03	-9999.

TABLE 5. (Continued)

ALTITUDE (FT.)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
346000	128	268	-50.3	*1363-03	*2032-03	-9999.
349000	128	268	-94.3	*1203-03	*1741-03	-9999.
352000	125	267	-38.2	*1061-03	*1491-03	-9999.
355000	116	266	-32.2	*9352-04	*1277-03	-9999.
358000	101	264	-26.2	*8237-04	*1094-03	-9999.
361000	079	265	-20.0	*7258-04	*9378-04	-9999.
364000	079	263	-11.0	*6562-04	*8159-04	-9999.
367000	078	261	-1.9	*5925-04	*7098-04	-9999.
370000	075	258	7.2	*5344-04	*6175-04	-9999.
373000	069	254	16.3	*4815-04	*5372-04	-9999.
376000	061	246	25.3	*4334-04	*4673-04	-9999.
379000	050	254	35.1	*3932-04	*4093-04	-9999.
382000	048	251	95.6	*3599-04	*3612-04	-9999.
385000	045	248	56.3	*3304-04	*3198-04	-9999.
388000	043	244	67.3	*3042-04	*2841-04	-9999.
391000	040	239	78.6	*2809-04	*2731-04	-9999.
394000	038	234	90.1	*2601-04	*2263-04	-9999.
397000	037	228	101.8	*2414-04	*2029-04	-9999.
400000	035	221	113.6	*2245-04	*1825-04	-9999.

ORIGINAL PAGE IS
OF POOR QUALITY

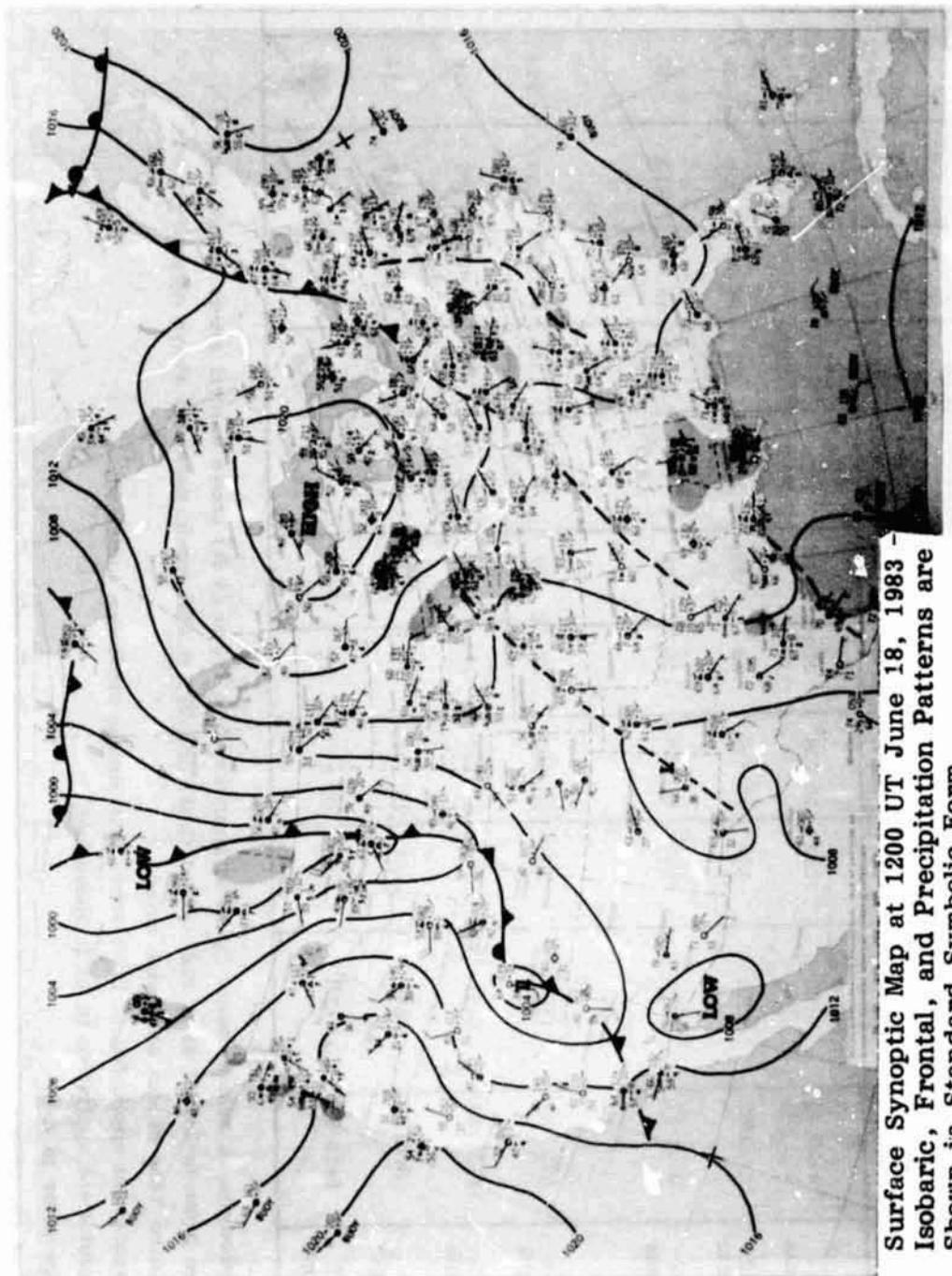
TABLE 6. SELECTED ATMOSPHERIC OBSERVATIONS FOR THE FLIGHT TESTS OF THE SPACE SHUTTLE VEHICLES

Seq. No.	Vehicle No.	Vehicle Data			Surface Observations				Inflight Conditions Max. Wind Below 60,000 ft				Count Down and Launch Comments of Meteorological Significance
		Launch Date	Time ^c Nearest Minute	Launch Pad	Thermodynamic ^a	Rel. Hum. (%)	Temp. (°C)	Press ^d N/cm ²	Wind ^b	Dir. (deg)	Alt. (ft)	Speed (ft/sec)	
1	STS-1 Columbia	4/12/81	0700	39A	10.234 ^e	21	82	11.8 15.2	125 120	44,300	98	250	
2	STS-2 Columbia	11/12/81	1010	39A	10.166	23	61	27.0 27.0	345 355	36,300	158	286	
3	STS-3 Columbia	3/22/82	1100	39A	10.160	24	71	7.0 ^f 8.0 ^f	50 ^f 145 ^f	45,000	119	250	Wind directional change observed at Pad just prior to L+0. ^g
4	STS-4 Columbia	6/27/82	1100 ^h	39A	10.200	29	70	5.8 ^j 4.9 ^j	133 ^j 141 ^j	47,900	37	329	
5	STS-5 Columbia	11/11/82	0719	39A	10.227	22	68	22.0 35.0	90 90	40,600	146	336	
6	STS-6 Challenger	4/4/83	1330	39A	10.183	23	55	12.7 16.4	63 55	46,100	155	277	
7	STS-7 Challenger	6/18/83	0733 ^h	39A	10.146	25	80	5.9 ^f 10.3 ^f	45,900 350 ^f	76	278		

ORIGINAL PAGE IS
OF POOR QUALITY

- a. Pad 39A thermodynamic measurements taken at approximately 1.2 m (4 ft) above natural grade at camera site No. 3
- b. 1 min average prior to L+0 of 60 ft PLP (listed first) and 275 ft FSS winds measured above natural grade.
- c. Eastern Standard Time unless otherwise noted.
- d. Pressure measurement applicable to 21 ft above MSL unless otherwise indicated.
- e. Pressure measurement applicable to 14 ft above MSL.
- f. 10 sec average prior to L+0.
- g. Due to onset of sea breeze.
- h. Eastern Daylight Time.
- i. 30 sec average prior to L+0.

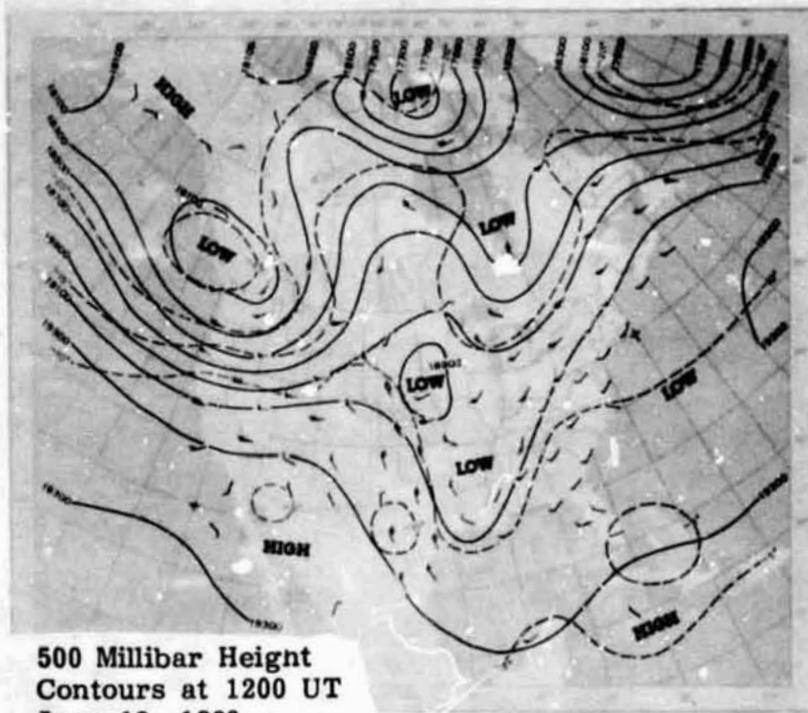
ORIGINAL PAGE IS
OF POOR QUALITY



Surface Synoptic Map at 1200 UT June 18, 1983 -
Isobaric, Frontal, and Precipitation Patterns are
Shown in Standard Symbolic Form.

Figure 1. Surface synoptic chart 27 min after launch of STS-7.

ORIGINAL PAGE IS
OF POOR QUALITY



500 Millibar Height
Contours at 1200 UT
June 18, 1983.

Continuous Lines Indicate Height Contours In
Feet Above Sea Level. Dashed Lines are Isotherms
In Degrees Centigrade. Arrows Show Wind Direction
and Speed at the 500 MB Level.

Figure 2. 500 mb map 27 min after launch of STS-7.

ORIGINAL PAGE IS
OF POOR QUALITY



Figure 3. GOES-5 visible imagery of cloud cover 3 min prior to launch of STS-7 (1130 UT, June 18, 1983). 500-mb contours and wind barbs are also included for 1200 UT.

ORIGINAL PAGE IS
OF POOR QUALITY

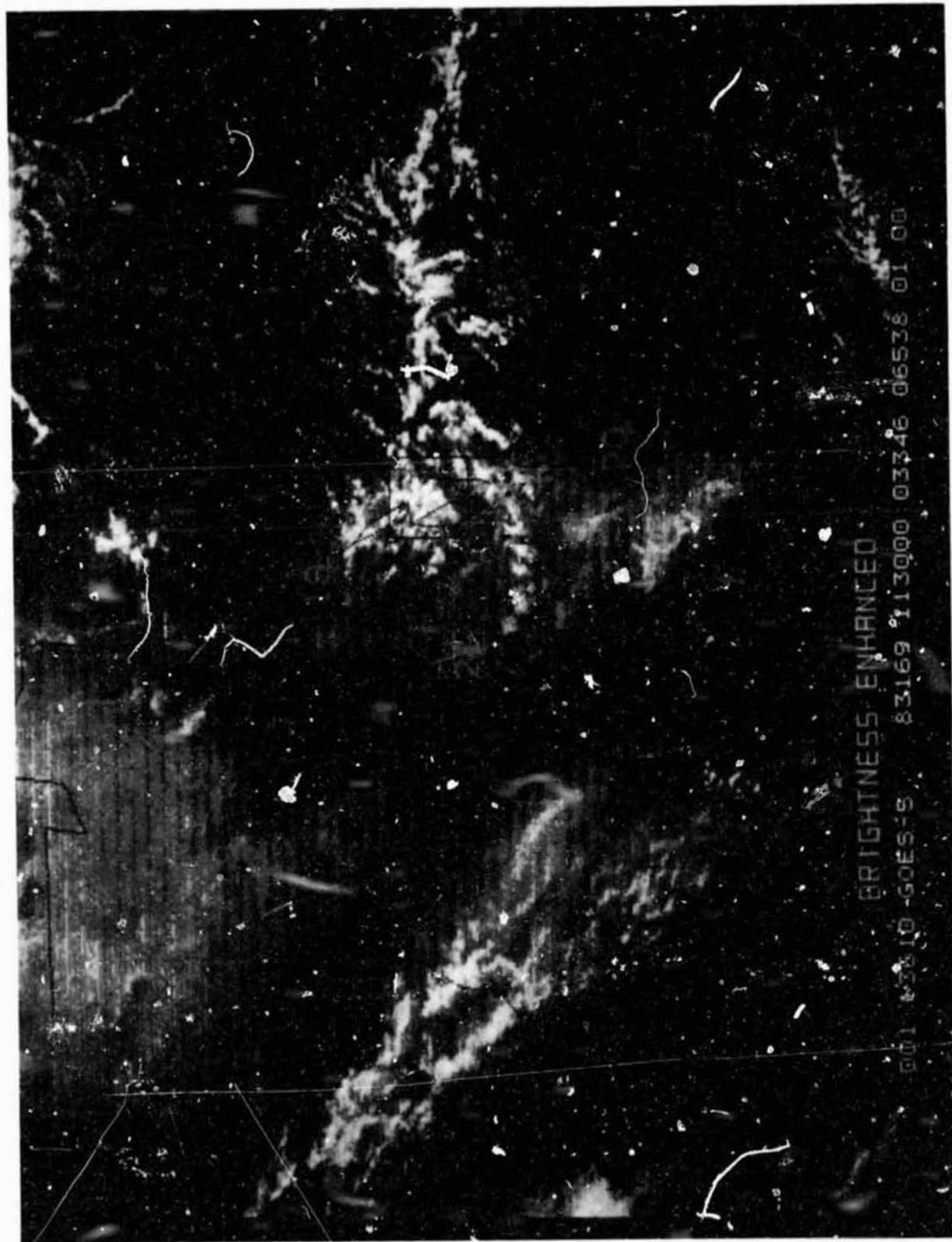
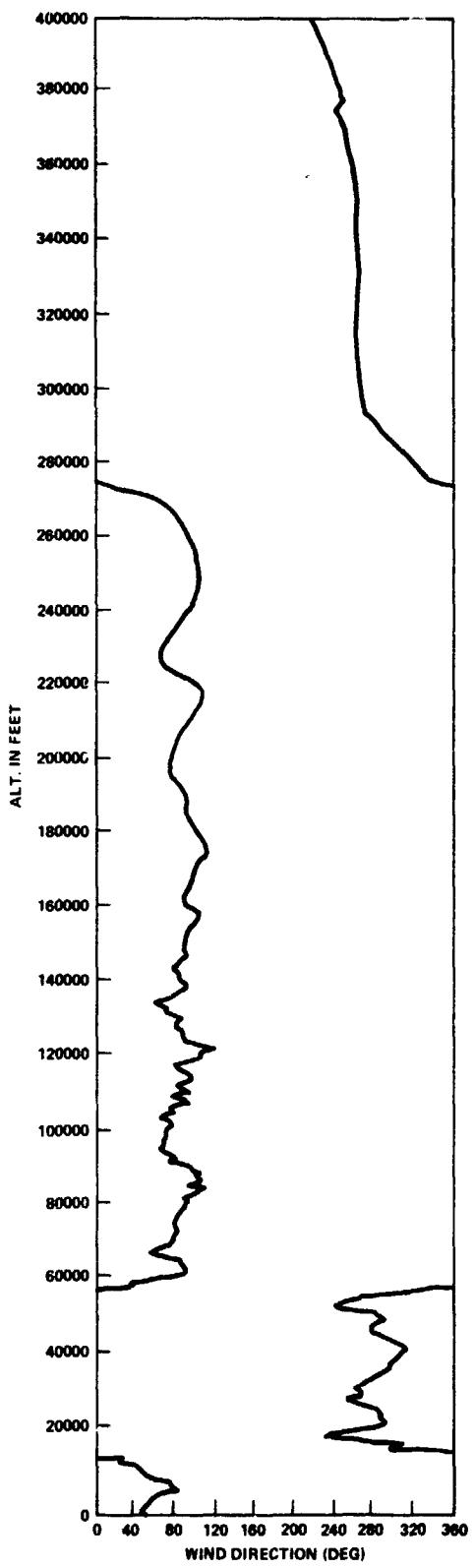
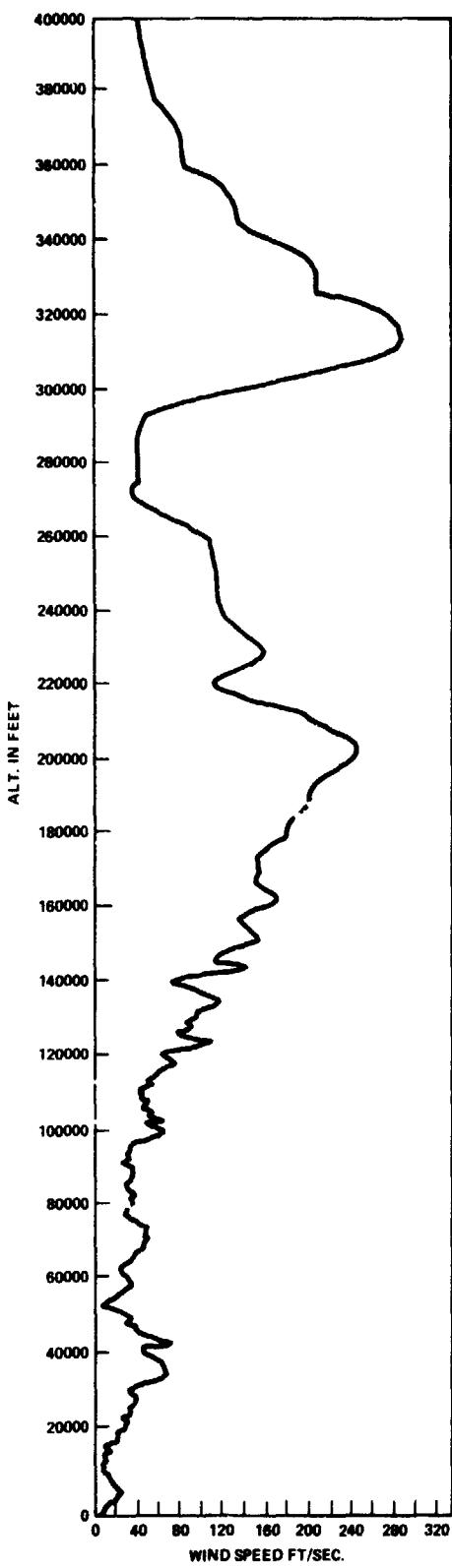


Figure 4. Enlarged view of GOES-5 visible imagery of cloud cover 3 min prior to launch of STS-7 (1130 UT, June 18, 1983). Surface temperature and wind barbs for 1100 UT are also included.



ORIGINAL PAGE IS
OF POOR QUALITY

Figure 5. Scalar wind speed and direction at launch time of STS-7.

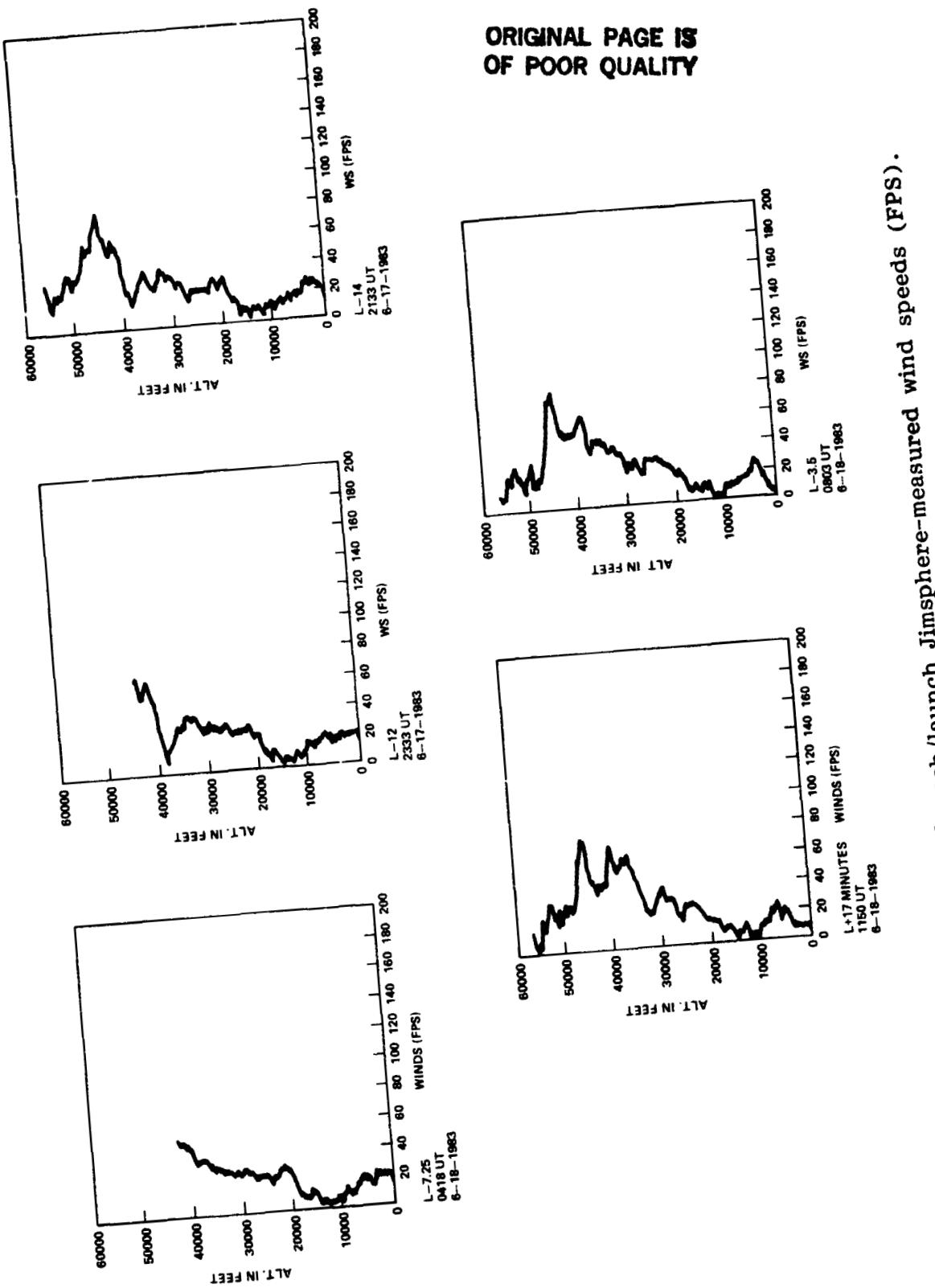


Figure 6. STS-7 prelaunch/launch Jimsphere-measured wind speeds (FPS).

ORIGINAL PAGE IS
OF POOR QUALITY

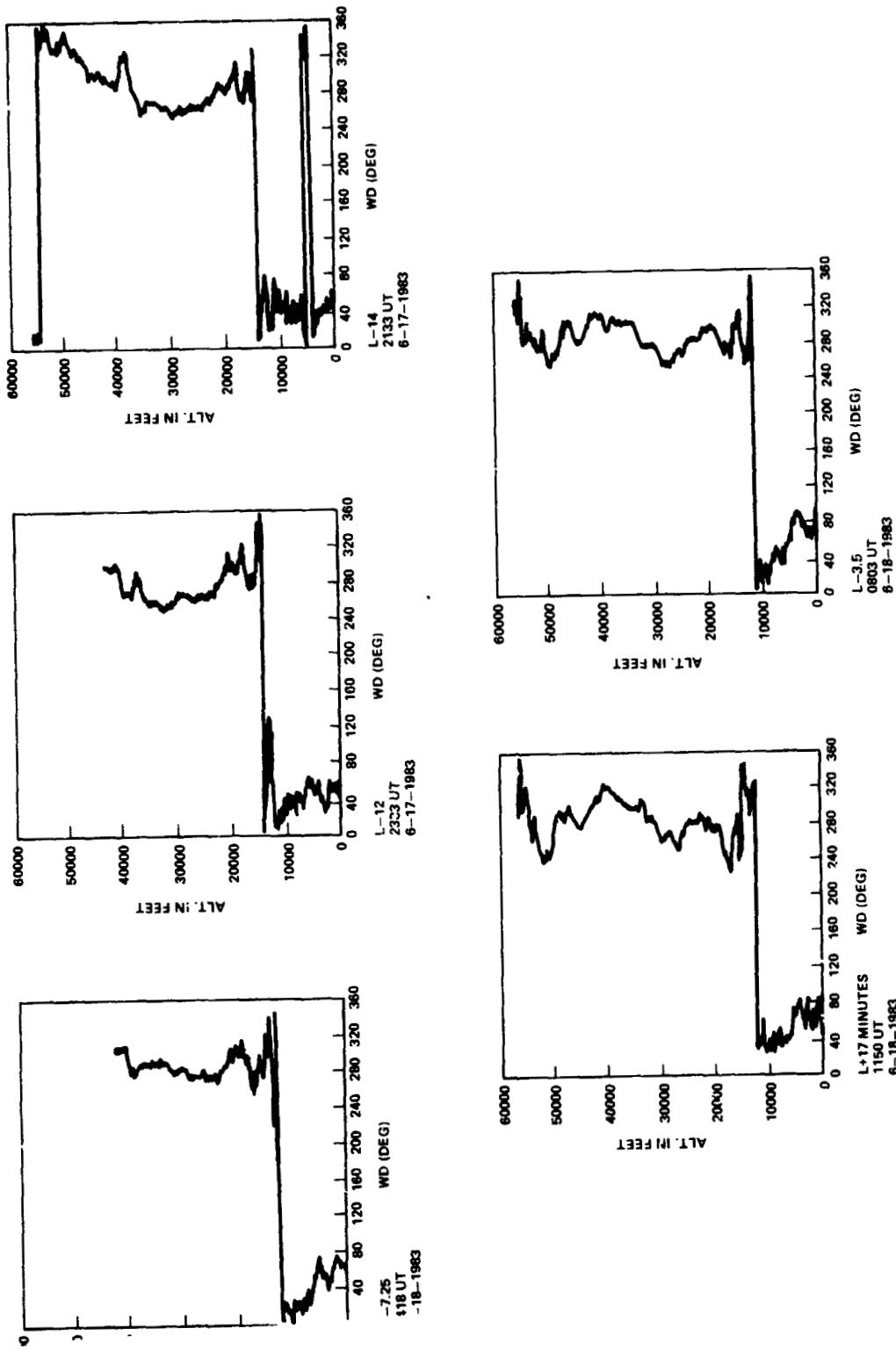


Figure 7. STS-7 prelaunch/launch Jimsphere-measured wind directions (degrees).

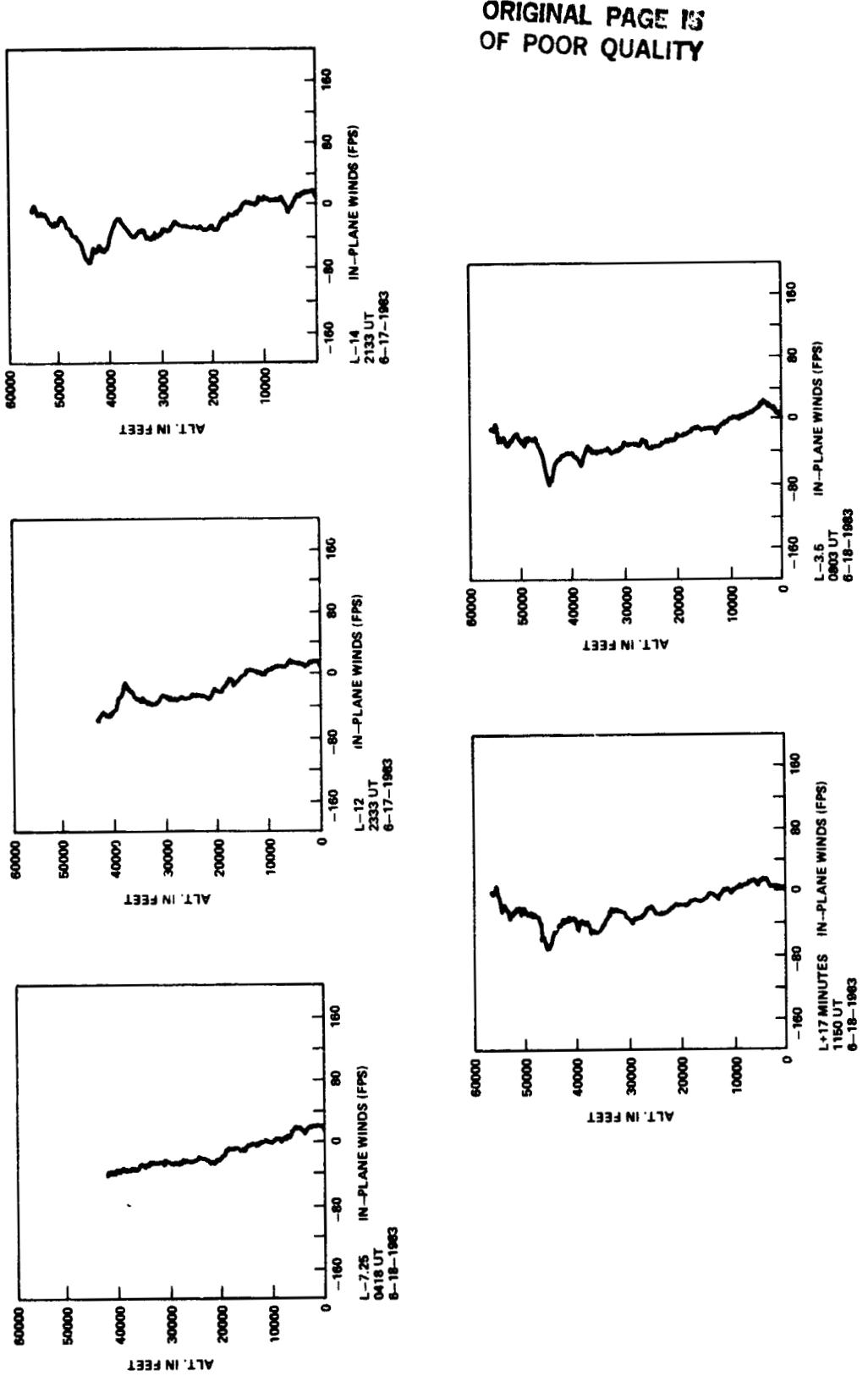


Figure 8. STS-7 prelaunch/launch Jimsphere-measured in-plane component winds (FPS).
Flight azimuth = 90 degrees.

ORIGINAL PAGE IS
OF POOR QUALITY

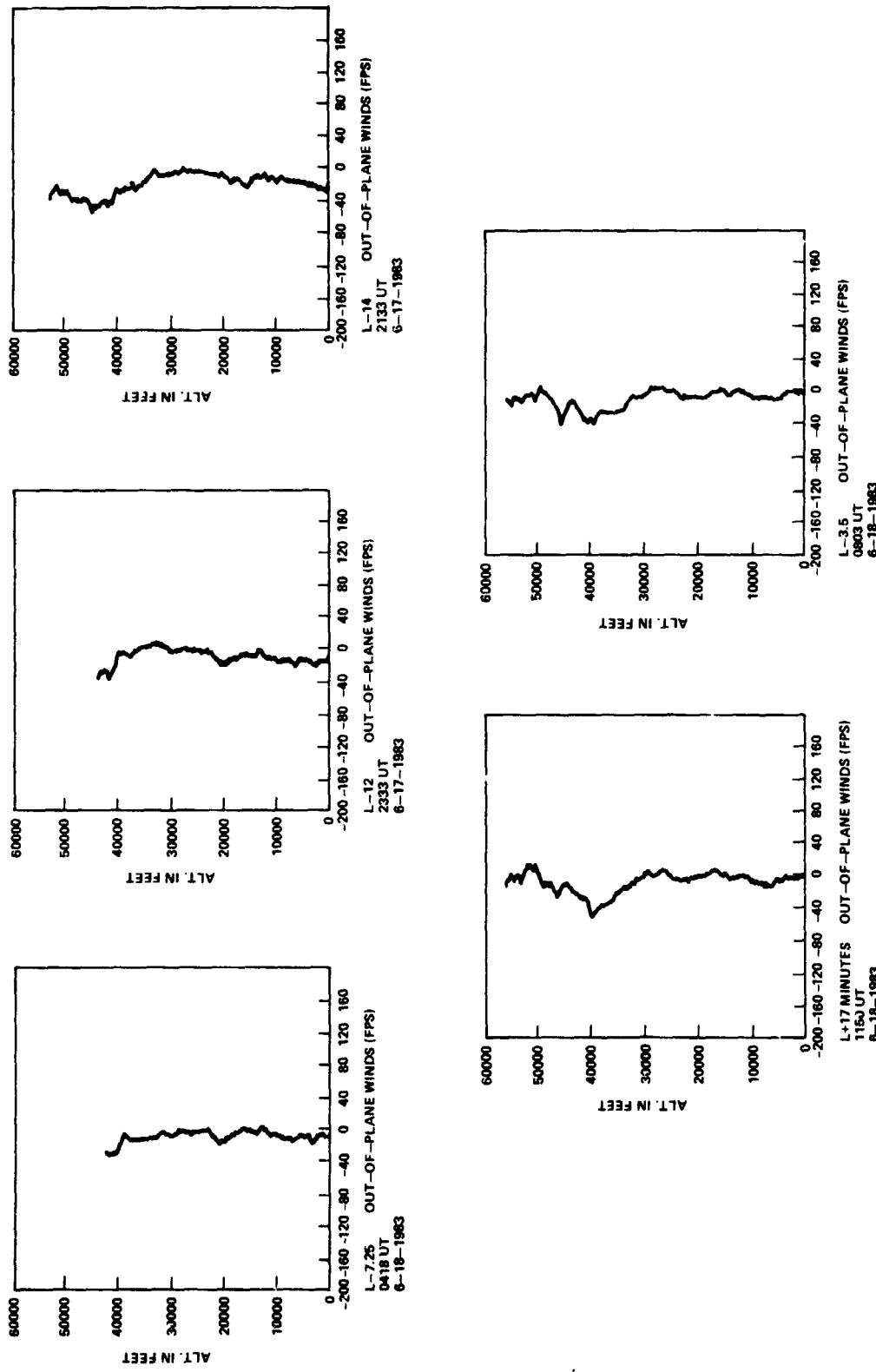
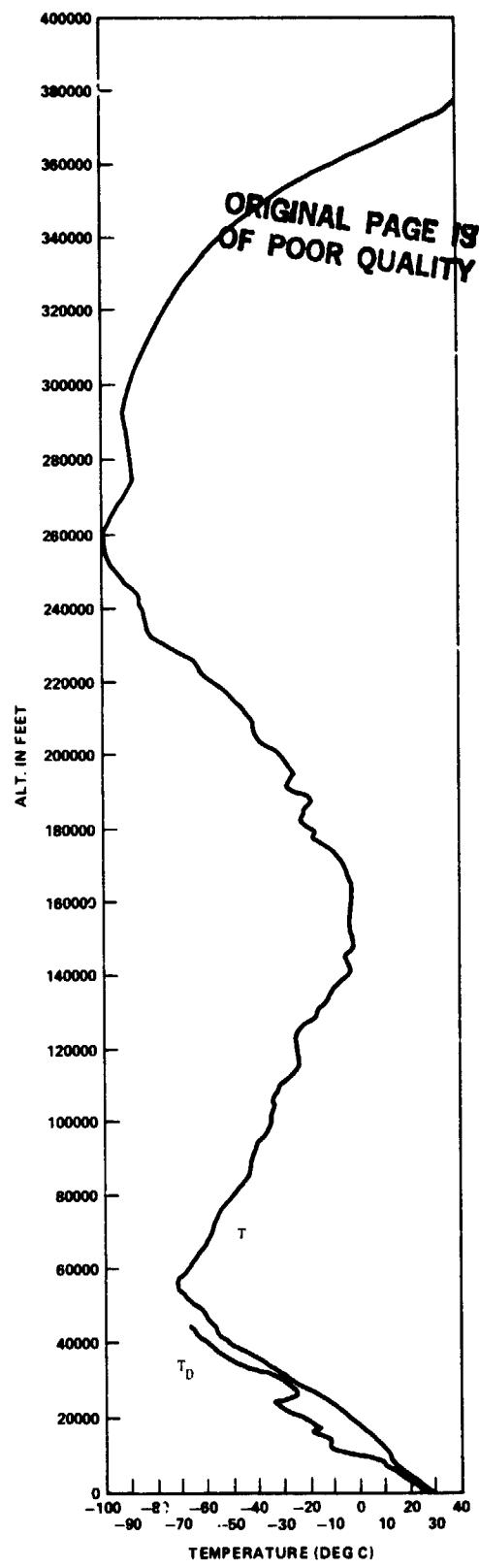
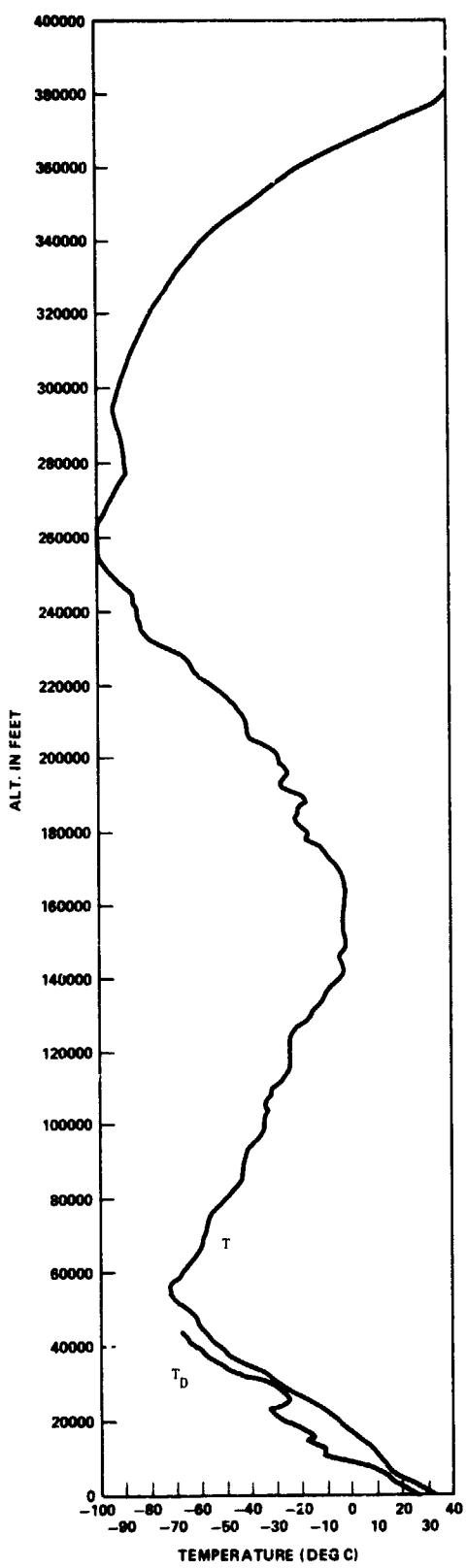


Figure 9. STS-7 prelaunch/launch Jimosphere-measured out-of-plane component winds (FPS).
Flight azimuth = 90 degrees.



T - Temperature
T_D - Dew point temperature

Figure 10. STS-7 temperature profiles versus altitude for launch (left) and Acoustic/SRB descent (right).

ORIGINAL PAGE IS
OF POOR QUALITY

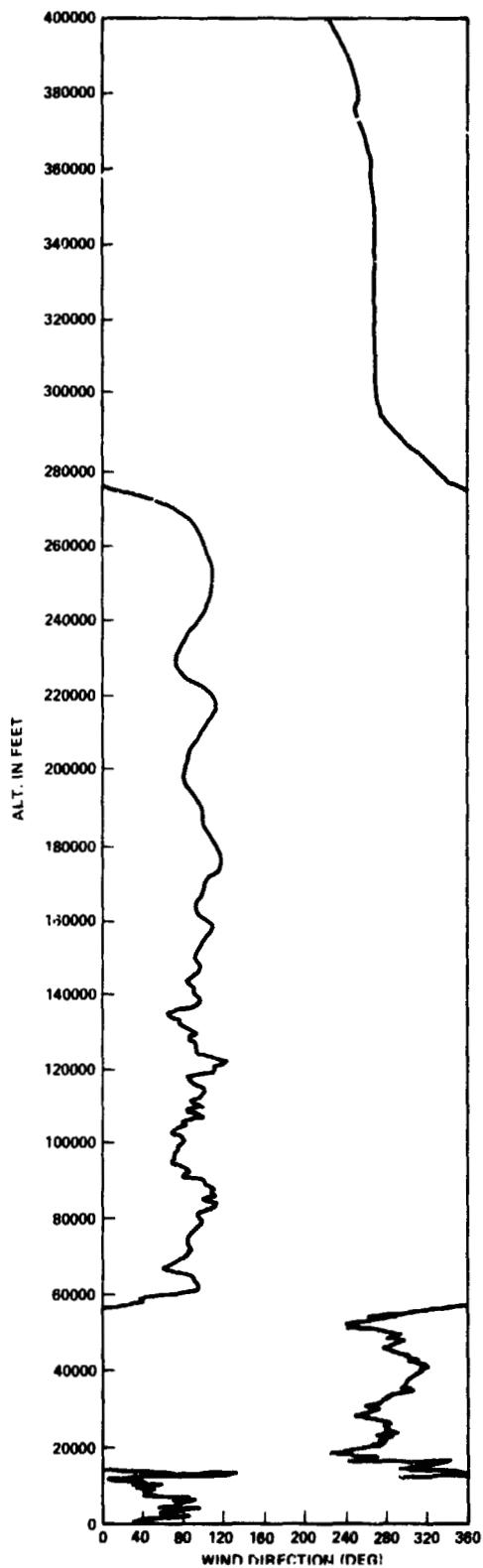
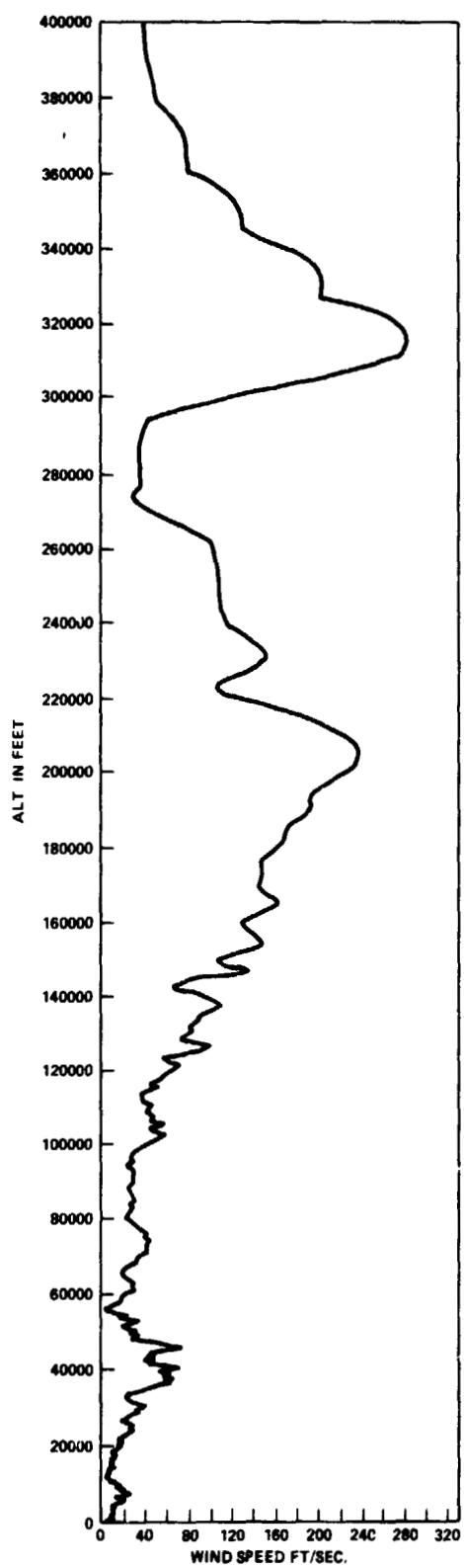


Figure 11. STS-7 scalar wind speed and direction for Acoustic/SRB descent.

REFERENCES

ORIGINAL PAGE IS
OF POOR QUALITY

1. Saturn Flight Evaluation Working Group: Saturr Launch Vehicle Flight Evaluation Report - Appendix A - Atmosphere (A separate report is prepared for each Saturn vehicle launch operation). George C. Marshall Space Flight Center, Alabama.
2. Johnson, D. L.: Summary of Atmospheric Data Observations for 155 Flights of MSFC/ABMA Related Aerospace Vehicles. NASA TM X-64796, December 5, 1973.
3. Johnson, D. L.: Atmospheric Environment for ASTP (SA-210) Launch. NASA TM X-64990. February 1976.
4. Johnson, D. L., Jasper, G., and Brown, S. C.: Atmospheric Environment for Space Shuttle (STS-1) Launch. NASA TM 82436, July 1981.
5. Johnson, D. L. and Brown, S. C.: Atmospheric Environment for Space Shuttle (STS-2) Launch. NASA TM 82463, December 1981.
6. Johnson, D. L., Brown, S. C., and Batts, G. W.: Atmospheric Environment for Space Shuttle (STS-3) Launch. NASA TM 82480, April 1982.
7. Johnson, D. L., Hill, C. K., and Batts, G. W.: Atmospheric Environment for Space Shuttle (STS-4) Launch. NASA TM 82498, July 1982.
8. Johnson, D. L., Hill, C. K., and Batts, G. W.: Atmospheric Environment for Space Shuttle (STS-5) Launch. NASA TM 82515, March 1983.
9. Johnson, D. L., Hill, C. K., and Batts, G. W.: Atmospheric Environment for Space Shuttle (STS-6) Launch. NASA TM 82529, May 1983.
10. Justus, C. G., et al.: The NASA/MSFC Global Reference Atmosphere Model - Mod 3 (with Spherical Harmonic Wind Model). NASA CR-3256, March 1980.
11. Smith, O. E. and Weidner, D. K.: A Reference Atmosphere for Patrick AFB, Florida, Annual (1963 Revision). NASA TM X-53139, September 23, 1964.

APPROVAL

ORIGINAL PAGE IS
OF POOR QUALITY

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-7) LAUNCH

By D. L. Johnson, C. K. Hill, and G. W. Batts

The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or nuclear energy activities or programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

Robert E. Turner

R. E. Turner
Chief, Atmospheric Effects Branch

W. W. Vaughan

W. W. Vaughan
Chief, Atmospheric Sciences Division

G. F. McDonough

G. F. McDonough
Director, Systems Dynamics Laboratory

* U.S. GOVERNMENT PRINTING OFFICE 1983-646-058/36